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Ontario. Legislative Assembly

SESSIONAL PAPERS.

VOL. XXIV—PART V.

SECOND SESSION OF SEVENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

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SESSION 1892.

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LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

Title.	No.	Remarks.
Accounts, Public	21	*Printed.*
Agricultural and Arts, Report	12	"
Agricultural College, Report	16	"
Agricultural Societies, Analysis	66	*Not printed.*
Albert Victor, Prince, Despatch	74	*Printed.*
Algoma East, Sales in	90	"
Asylums, Religious services in	87	*Not printed.*
Asylums, Report	7	*Printed.*
Bell, Judge, commutation	19	*Not printed.*
Benson, Judge, commutation	41	"
Births, Marriages and Deaths, Report	10	*Printed.*
Blind Institute, Report	4	"
Bonds and Securities	96	*Not printed.*
Borron's Report	3	*Printed.*
Business Tax	73	*Not printed.*
Canadian Institute, Report	17	*Printed.*
Children arrested	69	*Not printed.*
Clarence, Duke of, Despatch	74	*Printed.*
Courts, Fusion of	80	"
Crown Lands, Report	20	"
Dairymen's Association, Report	24	*Printed.*
Davis, Judge, commutation	38	*Not printed.*
Deaf and Dumb Institute Report	5	*Printed.*
Division Courts, Report	28	"
Dulmage, A. F., correspondence	98	*Not printed.*
Dundas and Waterloo Macadamized Road	85	*Printed.*
Dutton High School, correspondence	35	*Not printed.*
Education, Report	11	*Printed.*
" Dutton School, correspondence	35	*Not printed.*
" Napanee High School	44	"
" Sarnia High School	45	"
" Retirement of Professors	46	*Printed.*
" Retirement of Officials	47	"
" Industrial School Association	48	"
" Watford High School	50	*Not printed.*
" Publication of Arithmetic	51	"
" Publication of Writing Course	52	"
" Hagersville High School	53	"
" Publication of English History	54	"

Title.	No.	Remarks.
Education, Text Book Regulations	55	*Printed.*
" Publication, Drawing Course	56	*Not printed.*
" Upper Canada College Retirement	57	*Printed.*
" Report on University Extension	58	"
" Pupils attending Collegiate Institutes	78	*Not printed.*
Election Returns, Bye	70	*Printed.*
Elgin House of Industry, Report	62	*Not printed.*
Entomological Society, Report	15	*Printed.*
Estimates	22	"
Experimental Union, Report (part of)	16	"
Factories Report	25	*Printed.*
Fish and Game Commission, Report	79	"
Fish and Game Commission, expenses	37	*Not printed.*
Forest Reservation in Nipissing	81	"
Fruit Growers' Association, Report	18	*Printed.*
Game and Fish Commission, Report	79	*Printed.*
Game and Fish Commission, expenses	37	*Not printed.*
Gaols, Report	8	*Printed.*
Gaols, indigent persons in	91	"
Hastings County, Debentures	49	*Not printed.*
Health, Report	26	*Printed.*
Hospitals, Report	9	"
Houses of Refuge, Report	6	"
Immigration, Report	29	*Printed.*
Indigent persons in gaols	91	"
Insurance, Report	2	"
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Judicature Act, commutation	40	"
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Legal Offices, Report	27	*Printed.*
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Magdalen Asylums, Report	6	*Printed.*
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Medical Students, Education of	92	"

Title.	No.	Remarks.
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Mining lands, withdrawal of	83	*Not printed.*
Morson, Judge, commutation	67	"
Muir, Judge, commutation	40	"
Municipal Indebtedness	99	"
North Perth Election	64	*Not printed.*
Nottawasaga River	60	"
Orphan Asylums, Report	6	*Printed.*
Prison Reform	36	*Not printed.*
Prisons, Report	8	*Printed.*
Proton Commission	89	"
Public Accounts	21	"
Public Works, Report	23	"
Queen Victoria Niagara Falls Park, Report	30	*Printed.*
Reformatories, Report	8	*Printed.*
Refuge, Houses of, Report	6	"
Registrars' Fees	86	"
Registrars' Office, Toronto	65	*Not printed.*
Religious services in Asylums	87	"
Secretary and Registrar, Report	95	*Printed.*
Severn River	61	*Not printed.*
Statutes, Revised	32	"
Statutes, Sessional	33	"
Tavern and Shop Licenses, Report	14	*Printed.*
Timber Berths on North Shore	97	*Not printed.*
Timber sold in unlicensed territory	84	*Printed.*
Titles, Report of Master of	72	"
Toronto General Trusts' Company	63	"
Toronto Registry Offices	65	*Not printed.*
Toronto University, Bursar's Statement	31	*Printed.*
Toronto University, Finance Report	13	"
Toronto University, Retirement of Professors	46	"
Toronto University, Retirement of Officers	47	"
Toronto University, Medical Students Education	68	"
Toronto University, Medical Students Education	92	"
Toronto University, German teacher in	77	*Not printed.*
University Extension, Report	58	*Printed.*
Upper Canada College, Bursars' Statement	1	"
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LIST OF SESSIONAL PAPERS.

Arranged in Numerical Order, with their Titles at full length ; the Dates when Ordered and when Presented to the Legislature ; the name of the Member who moved for the same, and whether Ordered to be Printed or not.

CONTENTS OF PART I.

No. 1.. Statement of the Bursar of Upper Canada College for the year ending 30th June, 1891. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 2.. Report of the Inspector of Insurance for the year 1891. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 3.. Report of E. B. Borron on the Lakes and Rivers, Water and Water Powers of the Province of Ontario. Presented to the Legislature, 16th February, 1892. (*Printed.*)

No. 4.. Report upon the Ontario Institution for the education and instruction of the Blind, Brantford, for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 5.. Report upon the Ontario Institution for the education and instruction of the Deaf and Dumb, Belleville, for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 6.. Report upon the Houses of Refuge, Orphan and Magdalen Asylums for the year ending 30th September, 1891. Presented to the Legislature 5th April, 1892. (*Printed.*)

No. 7.. Report upon the Lunatic and Idiot Asylums for the Province for the year ending 30th September, 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

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No. 8... Report upon the Common Gaols, Prisons and Reformatories of the Province for the year ending 30th September, 1891. Presented to the Legislature 23rd February, 1892. (*Printed.*)

No. 9.. Report upon the Hospitals of the Province, for the year ending 30th September, 1891. Presented to the Legislature 23rd February, 1892. (*Printed.*)

No. 10.. Report of the Registrar-General, relating to the Registration of Births, Marriages and Deaths for the year 1890. Presented to the Legislature 6th April, 1892. (*Printed.*)

No. 11.. Report of the Minister of Education for the year 1891, with Statistics of 1890, in which is included the Reports upon the Scientific Societies, Toronto University, School of Practical Science and Upper Canada College. Presented to the Legislature 24th February, 1892. (*Printed.*)

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No. 12.. Report of the Agricultural and Arts Association for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 13.. Report of the Standing Committee of the University of Toronto on Finance. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 14.. Report upon the working of the Tavern and Shop Licenses Acts for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 15.. Report of the Entomological Society for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 16.. Report of the Ontario Agricultural College and Experimental Farm for the year 1891. Presented to the Legislature 8th March, 1892. (*Printed.*)

CONTENTS OF PART IV.

No. 17.. Report of the Canadian Institute for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

No. 18.. Report of the Fruit Gowers' Association for the year 1891. Presented to the Legislature 31st March, 1892. (*Printed.*)

No. 19.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Bell, Judge of the County Court of Kent. Presented to the Legislature 29th February, 1892. (*Not printed.*)

No. 20.. Report of the Commissioner of Crown Lands for the year 1891. Presented to the Legislature 22nd March, 1892. (*Printed.*)

No. 21.. Public Accounts of the Province for the year 1891. Presented to the Legislature 16th February, 1892. (*Printed.*)

CONTENTS OF PART V.

No. 22.. Estimates for the service of the Province until the Estimates for the year are finally passed. Presented to the Legislature 16th February, 1892. (*Not printed.*) Estimates for the year 1892. Presented to the Legislature 18th February, 1892. (*Printed.*) Estimates (supplementary) for the year 1892. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 23.. Report of the Commissioner of Public Works for the year 1891. Presented to the Legislature 24th Februery, 1892. (*Printed.*)

No. 24... Report of the Dairymen's Association for the year 1891. Presented to the Legislature 7th April, 1792. (*Printed.*)

No. 25.. Report of the Inspectors of Factories' for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 26.. Report of the Provincial Board of Health for the year 1891. Presented to the Legislature 6th April, 1892. (*Printed.*)

No. 27.. Report of the Inspector of Legal Offices for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

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No. 28.. Report of the Inspector of Division Courts for the year 1891. Presented to the Legislature 29th February, 1892. (*Printed.*)

No. 29.. Report of the Department of Immigration for the year 1891. Presented to the Legislature 25th March, 1892. (*Printed.*)

No. 30.. Report of the Commissioners of the Queen Victoria Niagara Falls Park for the year 1891. Presented to the Legislature 30th March, 1892. (*Printed.*)

No. 31.. Bursar's Statement of the cash transactions of the University of Toronto for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 32.. Statement as to the disposal of the Revised Statutes. Presented to the Legislature 16th February, 1892. (*Not printed.*)

No. 33.. Statement as to the disposal of the Sessional Statutes. Presented to the Legislature 16th February, 1892. (*Not printed.*)

No. 34.. Return to an Order of the House, of the eighth day of April, 1891, giving a tabulated statement shewing by License Districts :—1. The gross amount collected in each License District for (*a*) Fees for licenses. (*b*) Fees for transfers. (*c*) Fees for removals. (*d*) Fines. (*e*) Mileage. (*f*) Costs. 2. The amount expended in each License District for the following purposes :—(*a*) Inspectors' salaries. (*b*) Commissioners travelling expenses. (*c*) Postage and stationery. (*d*) Printing. (*e*) Advertising. (*f*) Fees and disbursements of Counsel. (*g*) Fees in unsuccessful cases. (*h*) Fees in cases of conviction where amounts not collected. (*i*) Detective service. (*j*) Other costs. (*k*) Expenses *re* transfers and removals. (*l*) Sundry expenses. 3. The proportion of the License Fund to which the Municipalities comprising each License District were entitled, and the amounts which were actually paid to them. Such return to be for each year since and including the license year ended the 30th April, 1885, to and including that ended the 30th April, 1890. A like statement for the year ending 30th April, 1882, and also a statement for the license year ending 30th April, 1877, showing the amount collected in each license district; the amount expended therein for inspector's salaries and other disbursements, and the amounts received by the Province and the Municipalities respectively. Presented to the Legislature 16th February, 1892. Mr. *Willoughby.* (*Printed.*)

No. 35.. Return to an Order of the House, of the tenth day of April, 1891, of copies of all correspondence between the Government or any member or officer thereof and the Municipal Council of the Township of Aldborough, or any ratepayer of the Township, on the subject of the Dutton High School or the litigation between the Board of that High School and the Municipality of the said Township in reference thereto, and on the subject of the legislation of last Session affecting the High School, and of all agreements entered into by the Government or any member thereof in reference thereto or in reference to indemnifying the Municipality against loss sustained by reason of such legislation. Presented to the Legislature 16th February, 1892. Mr. *Meredith.* (*Not printed.*)

No. 36.. Return to an Address to His Honour the Lieutenant-Governor, of the fifteenth day of April, 1891, praying that he will cause to be laid before this House, copies of the Commission issued with respect to Prison Reform, and of any instructions accompanying the same or connected therewith. Also, a Return showing in detail all expenses incurred or paid by the Province in connection with the said Commission, giving dates, items, and names. Presented to the Legislature 16th February, 1892. Mr. *Clancy.* (*Not printed.*)

No. 37.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-second day of April, 1891, praying that he will cause to be laid before this House a copy of the Commission with respect to Fish and Game protection, and of any instructions accompanying the same or connected therewith. Also, for a Return, showing in detail all expenses incurred or paid by the Province in connection with the said Commission, giving dates, items, and names. Presented to the Legislature 16th February, 1892. Mr. *Metcalfe.* (*Not printed.*)

No. 38.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Davis, Junior Judge of the County of Middlesex. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 39. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge McDonald, Judge of the County Court of the United Counties of Leeds and Grenville. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 40.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Muir, Junior Judge of the County of Wentworth. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 41.. Copy of an Order in Council respecting the commutation of fees under the Surrogate Courts Act to His Honour Judge Benson, Judge of the County Court of Northumberland and Durham. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 42.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Ketchum, Junior Judge of Northumberland and Durham. Presented to the Legislature 17th February, 1893. (*Not printed.*)

No. 43.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Ketchum, Junior Judge of Northumberland and Durham. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 44.. Copy of an Order in Council raising the Napanee High School to the standing of a Collegiate Institute, to take effect from the first day of September, 1890. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 45.. Copy of an Order in Council directing that the Sarnia High School rank as a Collegiate Institute from and after the eighth day of December, 1891. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 46.. Copy of an Order in Council approving of the Regulations for the retirement of Professors, Associate Professors, Lecturers, Demonstrators and Officers of the University of Toronto and University College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 47.. Copy of an Order in Council amending the Regulations for the retirement of Officers of the University of Toronto and of University College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 48.. Copy of an Order in Council approving of by-laws of the Industrial School Association of Toronto. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 49.. Copy of an Order in Council authorizing the Corporation of the County of Hastings, to invest the sum of $1,600 in Debentures. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 50.. Copy of an Order in Council approving of the By-law of the County of Lambton establishing an additional High School in the County to be situated in the Village of Watford. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 51.. Copy of an Order in Council approving of an Indenture with the Rose Publishing Company for the publication of the High School Arithmetic. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 52... Copy of an Order in Council authorizing the series of copy-books known as the Public Writing Course and directing the discontinuance of those now in use. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 53... Copy of an Order in Council approving of By-law No. 40 of the County of Haldimand establishing an additional High School in the Village of Hagersville. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 54.. Copy of an Order in Council approving of an Indenture with the Copp Clark Company (Limited), for the publication of the High School History of England and Canada. Presented to the Legislature 17th February, 1892. (*Not printed*)

No. 55.. Copy of a Minute of the Department of Education approving of Regulations with regard to Text-books. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 56.. Copy of an Order in Council approving of a certain Indenture with the Canada Publishing Company for the publication of the Public School Drawing Course. Presented to the Legislature 17th February, 1892. (*Not printed.*)

No. 57.. Copy of an Order in Council respecting formation of a Retirement Fund for the retirement of Teachers and Officers of Upper Canada College. Presented to the Legislature 17th February, 1892. (*Printed.*)

No. 58... Report of the Minister of Education on University Extension. Presented to the Legislature 25th February, 1892. (*Printed.*)

No. 59.. Report of the Trustees of Upper Canada College, on the new site and buildings. Presented to the Legislature 25th February, 1892. (*Printed.*)

No. 60... Return to an Order of the House, of the twenty-ninth day of April, 1891, for a Return of copies of all papers respecting the deepening of the Nottawasaga River. Also, showing the amount of money expended upon such works. Presented to the Legislature 19th February, 1892. Mr. *Wylie*. (*Not printed.*)

No. 61.. Return to an Order of the House, of the twenty-fifth day of March, 1891, for a Return of copies of all papers and correspondence, subsequent to that already brought down, between the Government, or any member or officer thereof, and any other person or persons, in reference to widening, deepening, or cleaning out the channel of the Severn River at the outlet of Lake Couchiching, or with reference to any clearing out the channel made by the Public Works Department. Presented to the Legislature 19th February, 1892. Mr. *Glendinning*. (*Not printed.*)

No. 62.. Report of the Inspector for the House of Industry, in the County of Elgin for the year 1891. Presented to the Legislature 22nd February, 1892. (*Not printed.*)

No. 63.. Statement of the Toronto General Trusts Company for the year 1891. Presented to the Legislature 22nd February, 1892. (*Printed.*)

No. 64.. Return to an Order of the House, of the twentieth day of March, 1891, for a Return showing the date of the certificate of the Judges appointed to try the election petition in the North Perth election case. The date when the certificate was received by the Clerk of the House. Copy of the Warrant for the issue of the new Writ for holding an election for the said Riding to fill the vacancy created by the decision of the Judges. Copy of the new Writ for holding the said election. Copies of all correspondence between Members of the Government, or any of them, or any Departmental officer or officers of the House, or with any person or persons with reference to the issue of the said Writ for the holding of the said new Election. Presented to the Legislature 23rd February, 1892. Mr. *Magwood*. (*Not printed.*)

No. 65.. Return to an Order of the House, of the tenth day of April, 1891, for a Return by the Registrars of East and West Toronto showing: (1) The total amount of fees earned during the year 1890. (2) The amount paid to the City of Toronto, or to Government for the City. (3) The amount of remuneration paid the Deputy Registrar. (4) The amount paid other Assistants and Clerks. (5) Amount paid for other purposes. (6) The average rate paid for copying *per* folio where payment was made in that way. (7) The total amount received by the Registrar for his personal use. (8) The expense which the City of Toronto has incurred to complete the divisions of the Registry office. (9) The amount which would have been paid to the City if there had been one Registrar instead of two. Presented to the Legislature 23rd February, 1892. Mr. *H. E. Clarke* (*Toronto.*) (*Not printed.*)

No. 66.. Reports of County, Township and Horticultural Societies in Ontario for the year 1890. Presented to the Legislature 24th February, 1892. (*Not printed.*)

No. 67 . Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour Judge Morson, Second Junior Judge of the County Court of York. Presented to the Legislature 24th February, 1892. (*Not printed.*)

No 68.. Return to an Order of the House, of the twentieth day of April, 1891, for a Return of copies of all correspondence between the Members of the Government, and other parties on the subject of the alleged education of Medical Students in part, at the public expense by the payment to members of one Medical Faculty of fees received from students for teaching done by Professors and Lecturers, whose salaries are paid entirely out of the funds of the Provincial University. Presented to the Legislature 2nd March, 1892. Mr. *Balfour.* (*Printed.*)

No. 69.. Return to an Order of the House, of the twentieth day of April, 1891, for a Return showing: 1. The number of children said to be under the age of fifteen years, arrested and brought before any Court in this Province during the year 1890. 2. The disposition of such children, shewing the numbers sent to (*a*) The Common Gaol. (*b*) To Industrial Schools or any charitable institution. (*c*) The Reformatory for Boys or Girls. (*d*) Those otherwise disposed of. 3. The number of such children who were tried separate and apart from other offenders, at suitable times, designated and appointed for that purpose pursuant to the Act for the protection and reformation of Neglected Children. Presented to the Legislature 2nd March, 1892. Mr. *Monk.* (*Not printed.*)

No. 70.. Return from the Records of the several Elections to the Legislative Assembly, in the Electoral Districts of Kingston, North Renfrew and East Wellington, since the General Election of 1890, showing: (1) The number of votes polled for each Candidate in each Electoral District in which there was a contest. (2) The majority whereby each successful Candidate was returned. (3) The total number of votes polled in each District. (4) The number of votes remaining unpolled. (5) The number of names on the Voters' List in each District. (6) The population of each District as shown by the last Census. Presented to the Legislature 14th March, 1892. (*Printed.*)

No. 71.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House copies of all correspondence and papers with reference to the appointment of Commissioners to open this House at its present Session or otherwise in regard to the opening of the House by some other than His Honour the Lieutenant-Governor. Presented to the Legislature 6th April, 1892. Mr. *Meredith.* (*Printed.*)

No. 72.. Report of the Master of Titles for the year 1891. Presented to the Legislature 11th March, 1892. (*Printed.*)

No. 73.. Return to an Order of the House, of the sixth day of April, 1891, for a Return showing what municipalities have passed By-laws under the provisions of the 4th section of the Act, 53 Vict. Cap. 55, imposing a business tax in lieu of the tax on personal property and what municipalities, after consideration of the question, have decided not to put the provisions of the said section into effect. Presented to the Legislature 11th March, 1892. Mr. *Barr* (*Dufferin.*) (*Not printed.*)

No. 74.. Despatch from the Right Honourable the Secretary of State for the Colonies, covering copies of communications from Her Majesty the Queen and their Royal Highnesses the Prince and Princess of Wales respecting the death of H. R. H. Prince Albert Victor, Duke of Clarence and Avondale, K.G. Presented to the Legislature 14th March, 1892. (*Printed.*)

No. 75.. Return to an Order of the House, of the seventh day of March, 1892, for a Return of copies of the application of Clara Brett Martin to the Law Society of Upper Canada, for admission as a student-at-law; of the report of the special Committee of the Benchers to which the application was referred; of the Minutes of the meeting of Benchers at which the report was adopted, and of all correspondence on the subject between the Law Society and other parties. Presented to the Legislature 14th March, 1892. Mr. *Balfour.* (*Printed.*)

No. 76.. Return to an Address to His Honour the Lieutenant-Governor, of the seventh day of March, 1892, praying that he will cause to be laid before this House copies of all Orders in Council setting apart or allotting out of any fund any sum or sums for the purchase of a site of Upper Canada College or the erection of the College buildings or any buildings on the grounds purchased for such site or for the furnishing or equipment of the College or for any other expenditure on capital account any way relating to the said College. Presented to the Legislature 16th March, 1892. Mr. *Meredith.* (*Printed*)

No. 77.. Return to an Order of the House, of the seventh day of March, 1892, for a Return shewing the names of all persons who were applicants for the position of assistant teacher of German in University College, together with copies of all correspondence between the Minister of Education, the Department of Education and the applicants and other persons relating thereto. Presented to the Legislature 16th March, 1892. Mr. *Whitney.* (*Not printed.*)

No. 78.. Return to an Order of the House, of the eleventh day of March, 1892, for a Return showing the number of pupils attending the Collegiate Institutes and High Schools for the year 1890. Giving, as far as possible, the professions, which in after life, these pupils intend to follow. Presented to the Legislature 16th March, 1892. Mr. *Gibson (Huron).* (*Not printed.*)

No. 79. Report of the Commission on the Game and Fish of the Province. Presented to the Legislature 18th March, 1892. (*Printed.*)

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No. 80.. Return to an Order of the House, of the fourth day of March, 1892, for a Return of copies of all correspondence with the Attorney-General or his Department on the subject of the fusion of the several Divisions of the High Court of Justice, and of changes in the practice of the said Court, and in the provisions for holding sittings for the trial of actions, and otherwise with regard to the distribution of the business of the Courts, with a view to the more speedy dispatch of such business. Presented to the Legislature 18th March, 1892. Mr. *Meredith.* (*Printed.*)

No. 81.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House copies of the Order in Council for the appointment of a Commission as to the proposed Forest Reservation and Park in the Nipissing District; of the Commission issued in pursuance thereof and the instructions, if any, to the Commissioners. Presented to the Legislature 21st March, 1892. Mr. *Meredith.* (*Not printed.*)

No. 82.. Return to an Order of the House, of the fourth day of March, 1892, for a Return of copies of the case submitted for the opinion of the Court of Appeal as to the validity of the local option provisions of the Municipal Act, and of the opinions of the judges of the said Court thereon, and of the judgment pronounced by the Court in the premises. Presented to the Legislature 21st March, 1892. Mr. *Meredith.* (*Printed.*)

No. 83.. Return to an Address to His Honour the Lieutenant-Governor, of the seventeenth day of April, 1891, praying that he will cause to be laid before this House, copies of all Orders in Council with reference to the withdrawal from sale of mining lands since the 1st of January, 1890, and of all returns or recommendations upon which such Orders in Council were passed. Also, a statement in detail shewing the persons by whom applications for grants of mining lands have been made since the 1st of January, 1889, in such withdrawn district, with the lots or tracts in respect of which such applications were made, and the disposal made of such application. Also, a list of every lot or tract of mining land which has been sold or disposed of since the 1st day of January, 1889, in such withdrawn district, with the names of the person or persons to whom, and the prices at which the same were disposed of, and of the amounts, if any, remaining unpaid on account of such purchases, with the names of the persons by whom the same are owing Presented to the Legislature 29th March, 1892. Mr. *White.* (*Not printed.*)

No. 84... Return to an Address to His Honour the Lieutenant-Governor, of the second day of March, 1892, praying that he will cause to be laid before this House a Return showing: 1. The quantity of pine in unlicensed territory disposed of since last Session. 2. The persons to whom the same was sold and the quantity sold to each of such persons. 3. The prices at which each sale was effected. 4. The terms and conditions of the sales. 5. The purchase money paid, and the amount, if any, remaining unpaid, giving the name of each purchaser, any part of whose purchase money is paid, and the amount unpaid by him. 6. Copies of the Orders in Council authorizing the sales, and the reports and other material on which the same were based. Presented to the Legislature 29th March, 1892. Mr. *Marter.* (*Printed.*)

No. 85.. Return to an Address to His Honour the Lieutenant-Governor, of the fourth day of March, 1892, praying that he will cause to be laid before this House a copy of the Order in Council for the sale and transfer of the Dundas and Waterloo Macadamized Road, and of all reports on which said Order in Council was based, and for a statement in detail of the receipts by the Province from the said road. Presented to the Legislature 29th March, 1892. Mr. *Meredith.* (*Printed.*)

No. 86.. Return of all fees and emoluments received by the Registrars of Ontario for the year 1891. Presented to the Legislature 29th March, 1892. (*Printed.*)

No. 87.. Return to an Order of the House, of the seventh day of March, 1892, for a Return showing the names of all persons or bodies who have received remuneration for holding religious services in the various Asylums of the Province as *per* statement on page 44 of the Report of the Inspector of Asylums for the year 1891. Presented to the Legislature 29th March, 1892. Mr. *Campbell* (*Durham*). (*Not printed.*)

No. 88.. Report of the Bureau of Mines for the year 1891. Presented to the Legislature 30th March, 1892. (*Printed.*)

No. 89.. Report of the Commission appointed to enquire into the claims made by the Township of Proton, in the County of Grey, to certain sums of money payable as alleged, to that Municipality for Public Improvements therein, under 16 Vict. cap. 159, sec. 14. Presented to the Legislature 31st March, 1892. (*Printed.*)

No. 90.. Return to an Order of the House, of the twentieth day of March, 1891, for a Return showing the amounts in yearly aggregate of all sums received from the sales of lands for agricultural purposes in Algoma East, from January 1st, 1871, to December 31st, 1891. All sums received from the sales of mineral land in Algoma East, during the same period. All sums received for bonuses, ground rents, or timber dues, or in respect of or from the sale of timber in Algoma East during the same period. All sums received from the collection of taxes upon lands in Algoma East during the same period. All sums received from the issue of liquor licenses in Algoma East during the same period; and all sums expended by the Government in the said electoral district of Algoma East for colonization roads or other public purposes during the same period. Presented to the Legislature 31st March, 1892. Mr. *Campbell* (*Algoma*). (*Printed.*)

No. 91.. Return to an Order of the House, of the 24th day of February, 1892, for a Return showing the number of persons confined in the different Gaols of the Province as indigent persons, unable to support themselves, and the length of time each person has been confined. Also, a Return showing the number of insane persons confined in the Gaols of the Province, the length of time each person has been confined, and the reason for being so confined. Presented to the Legislature 4th April, 1892. Mr. *Barr* (*Dufferin*). (*Printed.*)

No. 92.. Return to an Order of the House, of the eighteenth day of March, 1892, for a Return of copies of all correspondence, since the last Return, between any member of the Government and any other person or persons on the subject of the alleged education of medical students in part at the public expense, by the payment to members of one Medical Faculty of fees received from students for teaching done by Professors and Lecturers, whose salaries are paid entirely out of the funds of the Provincial University. Presented to the Legislature 4th April, 1892. Mr. *Balfour*. (*Printed.*)

No. 93.. Return to an Order of the House, of the first day of April, 1892, for a Return of copies of all correspondence between the Minister of Education, or any officer of his Department, and the Principal of Upper Canada College; between the Minister or any officer of his Department and the Trustees of the College; between the Principal and Trustees of said College and the Minister, or any officer of his Department, and any officer of the University of Toronto, in reference to the expenditures for the new site and buildings for the College, or the endowment of the College, or otherwise in reference to any expenditure assumed to be made under the authority of the Statute relating to the endowment of the College. Presented to the Legislature 4th April, 1892. Mr. *Miscampbell*. (*Printed.*)

No. 94.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-ninth April, 1891, praying that he will cause to be laid before this House a Return showing: (1) A list of the names of all companies incorporated by special Act or under the Act intituled "An Act respecting the incorporation of Joint Stock Companies by Letters Patent" with powers of Trust Companies. (2) Copies of all Orders in Council, Reports to Council and papers in relation to the incorporation of any such Company, and all correspondence passing between the Government or the Attorney-General, and any such Company or any person in reference to the incorporation of any such Company and the powers applied for or to be granted. (3) Copies of all Orders in Council passed in relation to any such Company under R.S.O. Chap. 157, sec. 74. (4) Copies of all agreements or contracts entered into with any such Company, for the investing through the instrumentality of such Company of the funds standing from time to time in the High Court of Justice or any part thereof, and of all bonds or securities taken from the investing Company as a guarantee against loss. (5) A Return of the amount of money in the High Court of Justice invested through the instrumentality of any such Company, with the name of such Company, during each of the years from 1881 to the present session, and of the amount now so invested, and of all orders and regulations of the Court in reference to the same. (6) A Return of the actual amounts of money lying in the High Court during each of the years from 1881 to the present session, including the amount invested. (7) Copies of all correspondence and papers passing between the Government or any member thereof, and the Judges of the High Court or any such Company in respect of any applications of any such Company to share in the business of investing moneys in the High Court of Justice or to enable public competitions for such business, and also copies of all papers in or relating to any application on the part of any such Company to the Judges of the High Court of Justice for any such purpose. (8) A Return of the amounts received from such Company in respect of moneys invested by them during each of the years from 1881 to the present session, and of amounts for interest, showing also the rate of interest allowed to suitors in respect of moneys lying in the High Court of Justice during the same period, and also of the use or application made of the difference between the interest received by the Court in respect of moneys invested and in the amount allotted and allowed to suitors, in respect of moneys lying in Court. (9) A Return showing the names of officers and directors and shareholders of all Companies through whose instrumentality the funds in the High Court of Justice have been and are being invested. (10) A Return showing the duties of the official guardian in respect of suitors in the High Court of Justice and minors, and in relation to moneys in the High Court of Justice, and the business of the Court generally, and of any change made in regard to his duties since the first day of January, 1889. Presented to the Legislature 6th April, 1892. Mr. *McMahon.* (*Not printed.*)

No. 95.. Report of the Secretary and Registrar of the Province for the year 1891. Presented to the Legislature 7th April, 1892. (*Printed.*)

No. 96.. Bonds and Securities of Public Officers for the year 1891. Presented to the Legislature 7th April, 1892. (*Not printed.*)

No. 97 . Return to an Order of the House, of the twenty-third day of March, 1892, for a Return showing the date when the persons to whom, and price for which timber berth No. 118, North Shore of Lake Huron was sold, the respective dates when, and the amounts in which, and persons by whom, the bonus

was paid. The date when the said limit was first placed under license, and the persons to whom the license was issued. Copies of all transfers of the said berth, or of any interest therein and copies of all correspondence, memoranda, rulings of the Commissioner of Crown Lands, or any other officer of his Department with reference to the said berth. And also, copies of all reports made to the said Department by any wood ranger or other officer of the Department as to the quantity of timber in the said berth. Presented to the Legislature 12th April, 1892. Mr. *Marter*. (*Not printed.*)

No. 98.. Return to an Order of the House, of the twenty-sixth day of February, 1890, for a Return of copies of all Departmental orders or correspondence with reference to the appointment of A. F. Dulmage as an officer of the Crown Lands Department. Also, copies of all correspondence between the Crown Lands Department or any officer thereof, including the Commissioner of Crown Lands, and the said Dulmage, (including all letters of instruction sent to him) since his appointment; also copies of all accounts furnished by him to the said Department. A full statement of all moneys received or collected by the said Dulmage, showing the dates when the same were received or collected, and on what account and from whom. A like statement of the moneys paid over by him to the said Department, and of the moneys misappropriated by him, or for which he did not account. Also, copies of all correspondence relating to his defalcation, between any member or officer of the Government and the said Dulmage or any other person, and of all reports in reference thereto, and a statement of the amounts paid to or received by the said Dulmage for salary or expenses in each year since his employment began. Presented to the Legislature 12th April, 1892. Mr. *Marter*. (*Not printed.*)

No. 99.. Return showing the indebtedness of Municipalities to the Government on the 1st January, 1892. Presented to the Legislature 12th April, 1892. (*Not printed.*)

ESTIMATES

OF THE

PROVINCE OF ONTARIO

FOR THE

YEAR ENDED 31ST DECEMBER,

1892.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO.
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

SUMMARY

Of the Estimated Expenditure of the Province of Ontario for the Financial Year ending 31st December, 1892.

No.	SERVICES.	PAGE.	TO BE VOTED. For Current Expenditure	On Capital Account.	For other purposes.
			$ cts.	$ cts.	$ cts.
I.	Civil Government	5	231,625 00		
II.	Legislation	12	124,000 00		
III.	Administration of Justice	13	398,720 20		
IV.	Education	17	655,826 92		
V.	Public Institutions Maintenance	22	834,968 00		
VI.	Immigration	33	10,000 00		
VII.	Agriculture	34	173,295 00		
VIII.	Hospitals and Charities	37	151,715 73		
IX.	Maintenance and Repairs of Government and Departmental Buildings	38	59,898 00		
X.	Public Buildings	41			
	(1) Repairs	..	18,250 00		
	(2) Capital Account	..		400,106 00	
XI.	Public Works	45			
	(1) Repairs	..	14,000 00		
	(2) Capital Account	..		17,178 00	
XII.	Colonization Roads	46		95,600 00	
XIII.	Charges on Crown Lands	49	130,209 00		
XIV.	Refund Account	50			23,115 8
XV.	Miscellaneous Expenditure	52	83,730 00		
XVI.	Unforeseen and Unprovided	52	50,000 00		
	Total	....	2,936,237 85	512,884 00	23,115 81

1. Current Expenditure for 1892	2,936,237 85
2. On Capital Account	512,884 00
3. Other purposes	23,115 81
Amount of Estimates	3,472,237 66

ESTIMATES OF EXPENDITURE

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR 1892.

I.—CIVIL GOVERNMENT.

To be voted per Statement (A) $231,625.00

No. of Vote.	A.	1891.	1892.	Compared with Estimates of 1891.	
				Increase	Decrease.
	To Salaries and Contingencies of the following Departments and Officers.	$ cts.	$ cts.	$ cts.	$ cts.
1	Government House.....	1,950 00	1,950 00		
2	Lieutenant-Governor's Office	3,980 00	3,980 00		
3	Executive Council and Attorney-General's Department.....	17,850 00	18,300 00	450 00	
4	Department of Education	19,000 00	19,150 00	150 00	
5	" Crown Lands	55,350 00	57,100 00	1,750 00	
6	" Public Works.....	20,550 00	20,900 00	350 00	
7	Treasury Department.....	29,720 00	30,445 00	725 00	
8	Provincial Secretary's Department	19,260 00	19,635 00	375 00	
9	Public Institutions	11,450 00	11,750 00	300 00	
10	Department of Agriculture.....	25,475 00	25,815 00	340 00	
11	Department of Immigration.....	1,600 00	1,650 00	50 00	
12	Provincial Board of Health	8,050 00	8,350 00	300 00	
13	Miscellaneous	12,500 00	12,600 00	100 00	
		226,735 00	231,625 00	4,890 00	

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
		$ cts.	$ cts.
	DETAILS.		
1	GOVERNMENT HOUSE		
	Expenses.		
	Gardener and Caretaker	500 00	500 00
	Fireman and Assistant Gardener	550 00	550 00
	Assistant Gardeners	900 00	900 00
		1,950 00	1,950 00
2	LIEUTENANT-GOVERNOR'S OFFICE.		
	Salaries.		
	Official Secretary	1,200 00	1,200 00
	Private Secretary	800 00	800 00
	Messenger	480 00	480 00
	Expenses.		
	Contingencies	1,500 00	1,500 00
		3,980 00	3,980 00
	EXECUTIVE COUNCIL AND ATTORNEY-GENERAL'S DEPARTMENT.		
	Salaries.		
	Attorney-General and Premier	5,000 00	5,000 00
	Clerk of Executive Council and Deputy Attorney-General	3,000 00	3,000 00
	Law Secretary of Department	800 00	800 00
	Clerk and Premier's Secretary	1,600 00	1,750 00
	Assistant Clerk of Executive Council	1,500 00	1,550 00
	Clerk and Shorthand-writer	1,100 00	1,150 00
	Clerk	800 00	850 00
	Clerk	500 00	550 00
	Messenger	350 00	400 00
	Expenses.		
	Housekeeper and Messenger	500 00	550 00
	Fireman	400 00	400 00
	Contingencies	2,300 00	2,300 00
		17,850 00	18,300 00
4	EDUCATION DEPARTMENT.		
	Salaries.		
	Minister of Education	4,000 00	4,000 00
	Deputy Minister	2,200 00	2,200 00
	Chief Clerk and Accountant	1,600 00	1,600 00
	Clerk and Minister's Secretary	1,300 00	1,300 00
	"	1,250 00	1,250 00
	"	1,250 00	1,250 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
4	EDUCATION DEPARTMEET—*Continued.*	$ cts.	$ cts.
	Salaries.		
	Clerk	1,100 00	1,100 00
	"	1,100 00	1,100 00
	"	750 00	750 00
	Junior Clerk	700 00	750 00
	"	700 00	750 00
	Clerk and Messenger	700 00	700 00
	Caretaker, including all allowances for cleaning office, museum, etc	500 00	500 00
	Expenses.		
	Postage	550 00	550 00
	Printing, paper for circulars and blanks	500 00	500 00
	Office stationery and account books	300 00	300 00
	Books, periodicals, papers, law and other reports, and advertising	150 00	200 00
	Contingencies	150 00	150 00
	Travelling and other expenses	200 00	200 00
5	CROWN LANDS DEPARTMENT.	19,000 00	19,150 00
	Salaries.		
	Commissioner	4,000 00	4,000 00
	Assistant Commissioner	2,800 00	2,800 00
	Law Clerk	2,000 00	2,000 00
	Clerk and Commissioner's Secretary	1,250 00	1,250 00
	Land Sales and Free Grants:—		
	Chief Clerk	1,900 00	1,900 00
	Clerk	1,350 00	1,400 00
	"	950 00	950 00
	"	750 00	750 00
	"	650 00	700 00
	Surveys, Patents and Roads:—		
	Director of Surveys	1,900 00	2,000 00
	Draughtsman	1,300 00	1,300 00
	Clerk of Patents	1,400 00	1,400 00
	Clerk	1,250 00	1,250 00
	"	1,000 00	1,000 00
	Superintendent, Colonization Roads	1,900 00	1,900 00
	Clerk	1,150 00	1,150 00
	"	850 00	850 00
	Woods and Forests:—		
	Chief Clerk	1,650 00	1,650 00
	Clerk	1,350 00	1,350 00
	"	1,100 00	1,100 00
	"	950 00	950 00
	"	800 00	850 00
	"	800 00	850 00
	"	700 00	1,000 00
	Accounts:—		
	Accountant and Book-keeper	1,800 00	1,800 00
	Clerk	1,200 00	1,200 00
	"	800 00	850 00
	"	1,100 00	1,100 00
	Registrar (former Registrar $1,600)	1,400 00	1,500 00
		40,050 00	40,800 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
5	CROWN LANDS DEPARTMENT.—*Continued.*	$ cts.	$ cts.
	BUREAU OF MINES.		
	Salaries.		
	Director of mines		2,500 00
	Clerk and Shorthand Writer (who also is charged with the work under The Cullers' Act)		1,300 00
	Inspector		750 00
			4,550 00
	Expenses.	4,800 00	
	Printing and Stationery		250 00
	Books		100 00
	Travelling expenses		600 00
	Postage and telegrams		150 00
	Sundries		150 00
		4,800 00	5,800 00
	Housekeeper	500 00	500 00
	Fireman	500 00	500 00
	Messenger	500 00	500 00
	Nightwatchman	500 00	500 00
	Contingencies	8,500 00	8,500 00
		55,350 00	57,100 00
6	PUBLIC WORKS DEPARTMENT.		
	Salaries.		
	Commissioner	4,000 00	4,000 00
	Architect	2,400 00	2,400 00
	Engineer	2,000 00	2,000 00
	Secretary, Public Works	2,100 00	2,100 00
	Accountant and Law Clerk	1,200 00	1,250 00
	Architectural Draughtsman	1,300 00	1,350 00
	Engineering "	1,200 00	1,300 00
	Assistant Architectural Draughtsman	950 00	1,000 00
	Assistant Engineering Draughtsman	1,000 00	1,050 00
	First Clerk and Shorthand Writer	1,100 00	1,100 00
	Clerk and Paymaster of outlying works	950 00	1,000 00
	Messenger	550 00	550 00
	Expenses.		
	Contingencies	1,800 00	1,800 00
		20,550 00	20,900 00
7	TREASURY DEPARTMENT.		
	Salaries.		
	Treasurer	4,000 00	4,000 00
	Assistant Treasurer	2,200 00	2,200 00
	Chief Clerk	1,350 00	1,350 00
	Clerk and Minister's Secretary	1,250 00	1,250 00
	Clerk and Cashier	1,100 00	1,100 00
	Clerk	950 00	1,000 00
	"	700 00	750 00
	Messenger	350 00	375 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
7	TREASURY DEPARTMENT—*Continued.*		
	Audit Branch.	$ cts.	$ cts.
	Auditor	2,400 00	2,400 00
	Book-keeper	1,400 00	1,450 00
	Clerk	900 00	950 00
	"	900 00	950 00
	Contingencies	800 00	800 00
	Expenses.		
	Housekeeper (half charged under Provincial Secretary's Department)	200 00	200 00
	Fireman (half charged under Provincial Secretary's Department)	250 00	250 00
	Contingencies	2,000 00	2,000 00
	Typewriter	120 00	120 00
		20,870 00	21,145 00
7	LICENSE AND ADMINISTRATION OF JUSTICE ACCOUNTS BRANCH.		
	LICENSE BRANCH.		
	Salaries.		
	First Officer	1,900 00	1,900 00
	Provincial Inspector and Accountant	1,400 00	1,400 00
	Provincial Inspector (heretofore paid out of appropriation *re* Scott Act)	1,400 00	1,750 00
	Assistant Accountant	1,100 00	1,200 00
	Clerk	1,000 00	1,000 00
	ADMINISTRATION OF JUSTICE ACCOUNTS BRANCH.		
	Salaries.		
	Clerk	1,400 00	1,400 00
	Expenses.		
	Stationery $300 00		
	Postage and telegraph 300 00		
	Sundries 50 00		
		650 00	650 00
		8,850 00	9,300 00
8	PROVINCIAL SECRETARY'S DEPARTMENT.		
	Salaries.		
	Secretary and Registrar	4,000 00	4,000 00
	Assistant Secretary	2,200 00	2,200 00
	Clerk	1,200 00	1,200 00
	"	1,100 00	1,100 00
	"	1,000 00	1,000 00
	Deputy Registrar	1,400 00	1,400 00
	Clerk	900 00	900 00
	"	850 00	850 00
	Clerk and Minister's Secretary	1,250 00	1,250 00
	Clerk and Shorthand Writer	700 00	750 00
	Engrossing Clerk	650 00	700 00
	Messenger	450 00	450 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
8	PROVINCIAL SECRETARY'S DEPARTMENT—*Continued.*		
	Expenses.	$ cts.	$ cts.
	Housekeeper (half charged to Treasury Department)	200 00	200 00
	Fireman " "	260 00	260 00
	Printing and binding	800 00	800 00
	Stationery	800 00	800 00
	Postage and telegraph	750 00	750 00
	Completing set of Statutes from 1792 down, and binding	.....	275 00
	Contingencies	750 00	750 00
9	PUBLIC INSTITUTIONS.	19,260 00	19,635 00
	Salaries.		
	Inspector of Asylums	2,600 00	2,600 00
	do extra for 1890	300 00	.....
	Inspector of Prisons and Charities	2,200 00	2,200 00
	Chief Clerk	1,200 00	1,300 00
	Clerk and Shorthand Writer	1,100 00	1,100 00
	Clerk	800 00	850 00
	Clerk	600 00	700 00
	Messenger, youth	300 00	300 00
	Expenses.		
	Travelling	900 00	1,100 00
	Postage and telegraph	500 00	550 00
	Printing	500 00	500 00
	Stationery	300 00	300 00
	Contingencies	150 00	250 00
		2,350 00	2,700 00
10	DEPARTMENT OF AGRICULTURE.	11,450 00	11,750 00
	Salaries.		
	Minister	4,000 00	4,000 00
	Deputy Minister and Secretary of Bureau of Industries	2,200 00	2,200 00
	Assistant Secretary	1,650 00	1,700 00
	Clerk	1,150 00	1,250 00
	"	900 00	900 00
	"	900 00	900 00
	"	900 00	900 00
	" and Shorthand Writer	900 00	1,000 00
	" and Shorthand Secretary	800 00	900 00
	Messenger	500 00	500 00
	Fireman, Agricultural Hall (8 months)	350 00	350 00
	Expenses.	14,250 00	14,600 00
	Contingencies	1,250 00	1,250 00
		15,500 00	15,850 00
10	REGISTRAR-GENERAL'S BRANCH.		
	Salaries		
	Deputy Registrar-General (also Secretary Board of Health)	.....	500 00
	Inspector	1,400 00	1,200 00
	Clerk	1,000 00	900 00
	"	900 00	900 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
10	REGISTRAR GENERAL'S BRANCH—*Continued.*		
	Salaries.	$ cts.	$ cts.
	Clerk	900 00	900 00
	"	900 00	800 00
	"	800 00	800 00
	"	700 00	.....
	Shorthand Writer, half time	.....	200 00
	Youth, messenger	.....	240 00
	Expenses.		
	For supply of blank forms to Postmaster	300 00	300 00
	Indices	200 00	200 00
	Schedules, slips, circulars, stationery and printing	1,950 00	2,000 00
	Postage and express charges	275 00	325 00
	Travelling expenses inspecting District Registrars	500 00	500 00
	Contingencies	150 00	200 00
		9,975 00	9,965 00
11	IMMIGRATION DEPARTMENT.		
	Secretary and Intelligence Officer	1,300 00	1,350 00
	Contingencies	300 00	300 00
		1,600 00	1,650 00
12	PROVINCIAL BOARD OF HEALTH.		
	Chairman	400 00	400 00
	Secretary	2,000 00	2,000 00
	Laboratory Assistant	1,000 00	1,100 00
	First Clerk	950 00	950 00
	Second "	800 00	800 00
	Printing, binding, stationery, etc	1,200 00	1,200 00
	Per diem allowance of members of Board when attending meetings of Council and Committees	700 00	700 00
	Travelling expenses of members of Board and Secretary	600 00	600 00
	Message and type-writing service	400 00	400 00
	Rent of offices	.....	200 00
		8,050 00	8,350 00
13	MISCELLANEOUS.		
	Cost of Official Gazette	3,000 00	3,000 00
	Queen's Printer's Salary	1,300 00	1,400 00
	Assistant Queen's Printer	1,200 00	1,200 00
	Contingencies, including stationery, postage, etc	100 00	100 00
	Inspector of Registry Offices	1,500 00	1,500 00
	Travelling expenses	400 00	400 00
	Inspector of Insurance } Repaid by Insurance Companies.	2,200 00	2,200 00
	Clerk } Repaid by Insurance Companies.	700 00	700 00
	Contingencies } Repaid by Insurance Companies.	500 00	500 00
	Clerk for special services *re* investigations	1,600 00	1,600 00
		12,500 00	12,600 00

II.—LEGISLATION

To be voted per Statement (A) $124,000 00

No. of Vote.	A.	1891.	1892.	Compared with Estimates of 1891.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
14	Legislation	122,700 00	124,000 00	1,300 00	.....

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
14	DETAILS.	$ cts.	$ cts.
	Salaries.		
	Mr. Speaker's salary	1,250 00	1,250 00
	Clerk of the House, salary	1,800 00	1,800 00
	One year's salary of late Clerk, Col. Gillmor	.....	1,800 00
	Clerk Assistant and Clerk of Routine	1,400 00	1,400 00
	Law Clerk, former salary, $1,000	700 00	700 00
	Clerk and Postmaster	1,000 00	1,000 00
	Librarian	1,600 00	1,600 00
	Assistant Librarian	750 00	750 00
	Accountant of the House and Stationery Clerk (also Queen's Printer) ...	400 00	400 00
	Sergeant-at Arms	600 00	600 00
	Housekeeper and Chief Messenger	700 00	700 00
	Five Messengers	2,550 00	2,550 00
	Fireman	450 00	450 00
	Nightwatchman	500 00	500 00
	Sessional Clerks, Writers, Messengers and Pages	10,000 00	11,000 00
	Expenses.		
	Postage and Cost of House Post Office	3,500 00	3,500 00
	Stationery, including printing paper, printing and binding	25,000 00	25,000 00
	Printing Bills and distributing Statutes	4,000 00	4,000 00
	Library, for books and binding, etc	3,000 00	3,000 00
	Printing and Binding Library Catalogue (re-vote)	1,500 00	.....
	Indemnity to Members, including mileage	57,000 00	57,000 00
	Subscription to newspapers and periodicals	1,000 00	1,000 00
	Contingencies	4,000 00	4,000 00
		122,700 00	124,000 00

III.—ADMINISTRATION OF JUSTICE.

To be voted per Statement (A).....$398,720 20.

No. of Vote.	A.	1891.	1892.
		$ cts.	$ cts.
15	Supreme Court of Judicature	54,273 00	55,808 00
16	Surrogate Judges and Local Masters	25,340 45	25,185 00
17	Miscellaneous Criminal and Civil Justice	320,721 00	317,727 20
		400,334 45	398,720 20

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
	DETAILS.	$ cts.	$ cts.
15	SUPREME COURT OF JUDICATURE.		
	Heir and Devisee Commissioners	5,000 00	5,000 00
	Registrar of Supreme Court and Court of Appeal	2,000 00	2,000 00
	Contingencies, printing, etc	75 00	75 00
	Master in Chambers	4,000 00	4,000 00
	Clerk	1,200 00	1,200 00
	Assistant Clerk	800 00	850 00
	Entering Clerk	550 00	550 00
	Contingencies	350 00	350 00
	Master in Ordinary	3,800 00	3,900 00
	Chief Clerk	1,600 00	1,600 00
	Shorthand Writer	800 00	800 00
	(This is besides certain fees, and an allowance as reporter to Judges on Circuit.)		
	Contingencies	200 00	200 00
	Two Taxing Officers	3,400 00	3,400 00
	Further allowance to continuing Officer	.....	200 00
	COURT OF APPEAL.		
	Clerk	900 00	950 00
	Usher and Messenger	600 00	600 00
	Judge's Library	100 00	100 00
	Contingencies	180 00	180 00
	HIGH COURT.		
	Clerk of the Process and of the Heir and Devisee Commission	1,400 00	1,400 00
	Clerk in his office	1,000 00	1,000 00
	Contingencies	50 00	50 00
	Clerk of Assize	1,150 00	1,200 00
	Contingencies	50 00	50 00

III.—ADMINISTRATION OF JUSTICE—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
15	CHANCERY DIVISION.	$ cts.	$ cts.
	Registrar and Judgment Clerk ..... (*The Registrar has also $400 from Suitor's Fund*)	2,100 00	2,100 00
	Assistant Registrar and Judgment Clerk	1,600 00	1,600 00
	Entering Clerk	750 00	750 00
	Clerk of Records and Writs	1,500 00	1,600 00
	Clerk in Records Office	450 00	500 00
	Youth	350 00	400 00
	Usher	600 00	600 00
	Messenger	400 00	400 00
	Housekeeper	300 00	300 00
	Assistant		300 00
	Judges' Library	200 00	200 00
	Surrogate Clerk	2,000 00	2,000 00
	Clerk in Surrogate Office	650 00	750 00
	Contingencies	20 00	20 00
	Contingencies for office of Registrar and Clerk of Records and Writs	750 00	750 00
	QUEEN'S BENCH DIVISION.		
	Registrar ..... (*The Registrar has also $500 from Suitor's Fee Fund*)	2,100 00	2,100 00
	Clerk	1,400 00	1,500 00
	"	1,000 00	1,050 00
	"	600 00	600 00
	Housekeeper and Messenger	600 00	600 00
	Two Assistants	588 00	588 00
	Usher and Crier	160 00	160 00
	Message Youth	225 00	250 00
	Judges' Library	100 00	100 00
	Messenger for Judge	450 00	450 00
	Contingencies	500 00	500 00
16	COMMON PLEAS DIVISION.		
	Registrar	2,500 00	2,500 00
	Travelling expenses		110 00
	Clerk	1,250 00	1,300 00
	Second Clerk	850 00	900 00
	Usher and Messenger	575 00	575 00
	Judges' Library	100 00	100 00
	Contingencies	500 00	500 00
		54,273 00	55,808 00
17	SURROGATE JUDGES, LOCAL MASTERS, ETC.		
	Allowances payable to Judges of Surrogate upon commutation of fees	12,072 45	11,917 50
	Allowance to Local Masters on commutation of their fees	13,268 00	13,268 00
		25,340 45	25,185 50
	MISCELLANEOUS CRIMINAL AND CIVIL JUSTICE.		
	Crown Counsel prosecutions	10,000 00	10,000 00
	Administration of Criminal Justice	155,000 00	155,000 00
	Inspector of Offices under Judicature Act	2,750 00	2,800 00
	Clerk and Shorthand Writer	1,000 00	1,000 00
	Travelling and other expenses	600 00	800 00
	Salaries, Provincial Detectives	3,000 00	3,000 00
	Special services	2,000 00	2,000 00
		174,150 00	174,600 00

III.—ADMINISTRATION OF JUSTICE.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
17	DIVISION COURT INSPECTION.	$ cts.	$ cts.
	Inspector of Division Courts	1,800 00	1,800 00
	Clerk	1,000 00	1,000 00
	"	1,000 00	1,000 00
	Travelling expenses and contingencies	1,050 00	1,050 00
		4,850 00	4,850 00
	MISCELLANEOUS JUSTICE.		
	To pay Sheriff's, Criers and Constables in attending Courts of Chancery and County Courts, Deputy Clerks of the Crown and Pleas attending Assizes, and their postages, etc	6,000 00	6,000 00
	Seals and other contingencies	300 00	300 00
	Litigation of Constitutional questions	12,000 00	12,000 00
	Expenses of County Judges in grouped Counties	1,200 00	1,800 00
	Judges' travelling expenses *re* Ditches and Watercourses Act	500 00	500 00
	For employment of Shorthand Reporters of evidence on trials at the Assizes and Election Courts	10,700 00	10,700 00
	Towards outer Counties' Libraries (Circuit and County Judges)	1,000 00	1,000 00
		31,700 00	32,300 00
	Deputy Clerks of the Crown	17,300 00	17,100 00
	" " " as Local Registrars	5,775 00	5,275 00
		23,075 00	22,375 00
	LAND TITLES OFFICE.		
	Master of Titles	3,800 00	3,800 00
	Chief Clerks	1,000 00	1,000 00
	Clerk	800 00	800 00
	"	800 00	800 00
	" (only six months for this year	700 00	350 00
	Youth	300 00	300 00
	Registers and Index Books	400 00	200 00
	Stationery and contingencies	100 00	100 00
	Additional iron shelving and furniture	100 00	.....
		8,000 00	7,350 00
	The fees received since the establishment of the office are as follows: In 1885 and 1886 together, $2,656.12; in 1887, $4,307.51; in 1888, $5,855.70; in 1889, $10,119.78; in 1890, $9,062; and in 1891, $6,470.10.		
	DRAINAGE ACT.		
	Salary of Referee	.....	3,500 00
	" Clerk and Shorthand Writer	.....	1,200 00
	Expenses	.....	1,000 00
			5,700 00
	OFFICES OF LOCAL MASTERS IN THE DISTRICTS.		
	Salaries and Allowances of Local Masters	1,860 00	
	Arrears for previous years	1,050 00	
	Master at Sault Ste. Marie $640 10		1,037 45
	" Parry Sound 848 53		587 55
	" Bracebridge 500 50		475 10
	" Port Arthur 554 35		670 00
	" North Bay 200 00		332 10
	Registry and Index Books	300 00	300 00
	Forms and other contingencies	400 00	300 00
	Travelling expenses	150 00	200 00
		3,760 00	3,902 20

III.—ADMINISTRATION OF JUSTICE.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
17	*District of Algoma.*	$ cts.	$ cts.
	Sheriff's salary	1,400 00	1,400 00
	Registrar's salary	800 00	800 00
	Clerk of the Peace and District Attorney	800 00	
	Clerk of the Peace and District Attorney	600 00	600 00
	Magistrate at Sudbury	1,400 00	1,400 00
	Magistrate at Algoma Mills	1,400 00	1,400 00
	Administration of Justice, etc	12,000 00	10,900 00
		18,400 00	16,500 00
	District of Thunder Bay.		
	Sheriff's salary	1,000 00	1,000 00
	House, fuel and light	250 00	250 00
	Clerk of the District Court (heretofore charged elsewhere)		450 00
	Chief Constable	400 00	400 00
	Police Magistrate at Port Arthur	800 00	800 00
	Travelling expenses of Police Magistrate on line between Port Arthur and Rat Portage	200 00	
	Administration of Justice, etc	7,000 00	5,900 00
		9,650 00	8,800 00
	District of Rainy River.		
	Stipendiary Magistrate, salary	1,600 00	1,600 00
	Sheriff	1,000 00	1,000 00
	Registrar and Clerk of District Court	700 00	700 00
	Administration of Justice,	6,000 00	6,000 00
		9,300 00	9,300 00
	District of Nipissing.		
	Stipendiary Magistrate for Southern Nipissing, salary	1,600 00	1,600 00
	" " Northern Nipissing, salary	1,200 00	1,300 00
	Administration of Justice, etc	3,500 00	3,500 00
		6,300 00	6,400 00
	District of Muskoka and Parry Sound.		
	Stipendiary Magistrate, Parry Sound	1,800 00	1,800 00
	" " *Muskoka, salary*	1,800 00	
	Sheriff (Muskoka) salary	500 00	500 00
	" (Parry Sound), salary	500 00	500 00
	Clerk of the Peace and District Attorney, salary	400 00	400 00
	Police Magistrate, salary and travelling expenses	500 00	500 00
	Clerk, District Court Parry Sound (difference charged elsewhere)	600 00	450 00
	Clerk (Bracebridge)	600 00	450 00
	Safe for Deputy Clerk of District Court, Bracebridge	86 00	
	Administration of Justice, etc	12,000 00	8,600 00
		18,786 00	13,200 00
	Provisional County of Haliburton.		
	Administration of Justice	150 00	150 00
		150 00	150 00

III.—ADMINISTRATION OF JUSTICE.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses, 1891.	Salaries and Expenses, 1892.
17	*District of Manitoulin.*	$ cts.	$ cts.
	Administration of Justice	2,000 00	2,000 00
	Salary of Registrar of Deeds and Master of Titles, Manitoulin	500 00	500 00
	Salary of Clerk of District Court and Surrogate Court, Manitoulin Island	250 00	300 00
		2,750 00	2,800 00
	Provincial Police on Niagara and Detroit Rivers.		
	Salary of Police Magistrate on Niagara River	1,200 00	1,200 00
	Administration of Justice "	5,800 00	5,800 00
	" " Detroit River	2,250 00	2,500 00
		9,250 00	9,500 00

IV.—EDUCATION.

To be voted per Statement (A) .....$655 826 92.

No. of Vote.	A.	1891.	1892.
	GRANTS TO SCHOOLS.	$ cts.	$ cts.
18	Public and Separate Schools	243,248 73	241,776 92
19	Schools in Unorganized Districts and Poor Schools	35,000 00	35,000 00
20	Kindergarten Schools	3,000 00	3,000 00
21	Night Schools	1,000 00	1,000 00
22	Public School Leaving Examinations		3,000 00
23	High Schools and Collegiate Institutes	100,000 00	100,000 00
24	Model Schools	9,300 00	9,000 00
25	Special grant to French Training School	800 00	800 00
26	" Public Schools in unorganized districts for training District Teachers	1,000 00	1,000 00
27	Teachers' Institutes	2,300 00	2,300 00
28	Ontario School of Pedagogy (grant)	1,200 00	1,500 00
29	Inspection of Schools	55,200 00	55,050 00
30	Departmental Examinations	14,750 00	17,800 00
31	Ontario School of Pedagogy (maintenance)	4,650 00	4,900 00
32	Normal and Model Schools, Toronto	22,460 00	23,490 00
33	" " " Ottawa	21,540 00	22,390 00
34	Library and Museum	5,250 00	5,300 00
35	School of Practical Science	13,370 00	15,750 00
36	Mechanics' Institutes, Art Schools, Literary and Scientific	48,450 00	50,450 00
37	Miscellaneous	3,500 00	2,500 00
38	Superannuated and Public and High School Teachers	59,800 00	59,800 00
		645,818 73	655,826 92

IV.—EDUCATION.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892
	GRANTS TO SCHOOLS.	$ cts.	cts.
	DETAILS.		
18	PUBLIC AND SEPARATE SCHOOLS	240,000 00	240,000 00
	Add from Municipalities Fund	3,248 73	1,776 92
		243,248 73	241,776 92
19	SCHOOL IN UNORGANIZED DISTRICTS AND POOR SCHOOLS	35,000 00	35,000 00
20	KINDERGARTEN SCHOOLS (according to average attendance)	3,000 00	3,000 00
21	NIGHT SCHOOLS (according to average attendance)	1,000 00	1,000 00
22	PUBLIC SCHOOL LEAVING EXAMINATIONS	....	3,000 00
23	125 HIGH SCHOOLS AND COLLEGIATE INSTITUTES, including special to Port Arthur and Gravenhurst (122 last year)	100,000 00	100,000 00
24	60 MODEL SCHOOLS	9,300 00	9,000 00
25	SPECIAL GRANT TO FRENCH-ENGLISH TRAINING SCHOOL	800 00	800 00
26	GRANT TO PUBLIC SCHOOLS IN UNORGANIZED DISTRICTS FOR TRAINING DISTRICT TEACHERS	1,000 00	1,000 00
27	TEACHERS' INSTITUTES	2,300 00	2,300 00
28	ONTARIO SCHOOL OF PEDAGOGY (arrears of 1891, $500)	1,200 00	1,500 00
29	INSPECTION OF SCHOOLS.		
	6,100 Public Schools (including Model Schools)	30,000 00	30,500 00
	Public Schools in cities and towns separated from county	5,500 00	5,500 00
	Two Inspectors of High Schools	5,000 00	5,000 00
	Two Inspectors of Separate Schools	3,400 00	3,400 00
	Two Inspectors in Unorganized Districts	3,000 00	3,000 00
	One Inspector of Model Schools	1,750 00	1,850 00
	Allowance to Inspectors in Muskoka, Bruce and Hastings	1,100 00	1,100 00
	Travelling expenses seven Inspectors	2,800 00	2,800 00
	Stationery, postage and incidentals	1,900 00	1,900 00
	Arrears, Public School Inspectors (1890)	750 00	.....
30	DEPARTMENTAL EXAMINATIONS.	55,200 00	55,050 00
	Examiners for High School Entrance and Leaving, Normal and County Model School examinations (reimbursed by fees)	11,500 00	14,500 00
	Stationery, postage and incidentals	500 00	500 00
	Salary of Printer	900 00	950 00
	Material for printing office and assistant	1,100 00	1,100 00
	Salary of Clerk	750 00	750 00
31	ONTARIO SCHOOL OF PEDAGOGY.	14,750 00	17,800 00
	Professor of Psychology	3,000 00	3,000 00
	Lecturers on Methods	400 00	500 00
	Instructor in Reading and Elocution	300 00	400 00
	Instructors in Stenography and Hygiene	300 00	250 00
	Instructor in Drill and Calisthenics	150 00	250 00
	Printing and incidentals	500 00	500 00
		4,650 00	4,900 00

IV.—EDUCATION—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
32	NORMAL AND MODEL SCHOOLS, TORONTO.		
	Salaries.	$ cts.	$ cts.
	The Principal	2,500 00	2,500 00
	Second Master	2,000 00	2,000 00
	Drawing Master	900 00	800 00
	French Teacher	150 00	150 00
	Music Teacher	850 00	900 00
	Drill and Gymnastic Master	300 00	530 00
	Head Master of Boys' Model School	1,450 00	1,500 00
	Four Assistants "	3,450 00	3,650 00
	Head Mistress of Girl's Model School	1,050 00	1,100 00
	Four Assistants "	2,800 00	2,950 00
	Teacher of Kindergarten and Provincial Inspector	850 00	900 00
	Assistant Teacher of Kindergarten	480 00	480 00
	Teacher of Reading and Elocution	.....	300 00
	Head Gardener (including $250 in lieu of house)	660 00	660 00
	Assistant Gardener	400 00	400 00
	First Engineer, including $200 for house and fuel	610 00	610 00
	Second "	400 00	400 00
	Third "	400 00	400 00
	Janitor of Normal School, including cleaning	510 00	510 00
	" Boys' Model School "	400 00	400 00
	" Girls' " "	400 00	400 00
		20,510 00	21,540 00
	Expenses.		
	Text and reference book for Masters, and reading-room for Students	200 00	200 00
	Stationery, chemicals and contingencies	1,000 00	1,000 00
	Text books for Model School pupils	600 00	600 00
	Supplies for Kindergarten	150 00	150 00
		22,460 00	23,490 00
33	NORMAL AND MODEL SCHOOLS, OTTAWA.		
	Salaries.		
	The Principal	2,500 00	2,500 00
	Second Master	2,000 00	2,000 00
	Drawing Master	850 00	900 00
	French Teacher	150 00	150 00
	Music Master	850 00	900 00
	Clerk and Accountant	600 00	600 00
	Drill and Gymnastic Master	300 00	300 00
	Head Master of Boys' Model School	1,450 00	1,500 00
	Three Assistants "	2,900 00	3,050 00
	Head Mistress of Girl's Model School	1,050 00	1,100 00
	Three Assistants "	2,300 00	2,450 00
	Teacher of Kindergarten	850 00	900 00
	Assistant Teacher of Kindergarten	480 00	480 00
	Teacher of Reading and Elocution	.....	300 00
	First Engineer and Gardener	600 00	600 00
	Second " "	450 00	450 00
	Laborer on grounds	400 00	400 00
	Janitor, Normal School, salary with allowance for cleaning	510 00	510 00
	" Boys' Model School, salary	400 00	400 00
	" Girls' " "	400 00	400 00
	Night Watchman	400 00	400 00

IV.—EDUCATION.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
		$ cts.	$ cts.
33	NORMAL AND MODEL SCHOOLS, OTTAWA—*Continued.*		
	Expenses.		
	Text and reference books for masters, and reading-room for students	200 00	200 00
	Stationery, chemicals and supplies	1,150 00	1,150 00
	Text Books for Model School pupils	600 00	600 00
	Supplies for Kindergarten	150 00	150 00
		21,540 00	22,390 00
34	LIBRARY AND MUSEUM.		
	Salaries and Expenses.		
	Librarian and Historiographer	2,000 00	2,000 00
	Assistant Librarian	550 00	550 00
	Clerk	550 00	600 00
	Postage and stationery	100 00	100 00
	Incidentals and purchases	650 00	650 00
	Binding books and periodicals	200 00	200 00
	Educational and technical books for reference	500 00	500 00
	Binding pamphlets, Library	200 00	200 00
	Museum	500 00	500 00
		5,250 00	5,300 00
35	SCHOOL OF PRACTICAL SCIENCE.		
	Salaries.		
	Professor in Engineering and Principal	2,800 00	2,800 00
	" Applied Chemistry	1,500 00	1,500 00
	" Metallurgy and Assaying (part year 1891)	750 00	1,800 00
	Lecturer in Surveying	1,200 00	1,200 00
	" Architecture	1,200 00	1,200 00
	" Electrical Engineering	1,200 00	1,200 00
	" Sanitary "	500 00	1,200 00
	Fellow in Engineering (one year in 1891)	250 00	500 00
	" Chemistry	500 00	500 00
	" Metallurgy and Assaying (half year)	.....	250 00
	Attendant in Chemistry	200 00	200 00
	" Metallurgy	.....	200 00
	Caretaker, including allowance for house	750 00	750 00
	Engineer	720 00	720 00
	Fireman	400 00	400 00
	Expenses.	11,970 00	13,700 00
	Chemical Laboratory	500 00	500 00
	Assaying "	200 00	200 00
	Physical "	200 00	200 00
	Engineering "	.....	500 00
	Printing, advertising and incidentals	450 00	600 00
	Telephone	50 00	50 00
		13,370 00	15,750 00

IV.—EDUCATION—*Concluded.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
36	MECHANICS' INSTITUTES, ART SCHOOLS, LITERARY AND SCIENTIFIC.	$ cts.	$ cts.
	Superintendent Mechanics' Institutes	1,700 00	1,700 00
	Clerk " "	650 00	650 00
	242 Mechanics' Institutes (223 in 1891)	39,000 00	41,000 00
	Art School Examinations	1,200 00	1,200 00
	Ontario Society of Artists	500 00	500 00
	Eight Art Schools	3,200 00	3,200 00
	Canadian Institute, Toronto	1,000 00	1,000 00
	Institut Canadien, Ottawa	400 00	400 00
	Ottawa Literary and Scientific Society	400 00	400 00
	Hamilton Literary Institute	400 00	400 00
		48,450 00	50,450 00
37	MISCELLANEOUS.		
	For cost of Minister's Report	500 00	500 00
	School Registers	1,000 00	1,000 00
	School Act to be sold to Trustees, etc	2,000 00	1,000 00
		3,500 00	2,500 00
38	SUPERANNUATED PUBLIC AND HIGH SCHOOL TEACHERS.		
	Annual Retiring allowance to Teachers and Inspectors	59,500 00	59,500 00
	Medical Examination fees, printing paper and incidentals	300 00	300 00
		59,800 00	59,800 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.

To be voted per Statement (A) ..... $834,968 00.

No. of Vote.	A	Voted for 1891.	To be Voted for 1892.	Compared with Estimate of 1891. Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
39	Asylum for Insane, Toronto	101,816 00	100,442 00	.....	1,374 00
40	Mimico Branch	48,126 00	67,158 00	19,032 00	.....
41	Asylum for Insane, London	134,482 00	130,996 00	.....	3,486 00
42	" " Kingston	78,397 00	79,672 00	1,275 00	.....
43	" " Hamilton	137,457 00	122,857 00	.....	14,600 00
44	" Idiots, Orillia	60,202 00	65,002 00	4,800 00	.....
45	Central Prison, Toronto	125,895 00	121,990 00	.....	3,905 00
46	Ontario Reformatory for Boys, Penetanguishene	41,650 00	38,050 00	.....	3,600 00
47	Institution for the Deaf and Dumb, Belleville	43,973 00	43,971 00	.....	2 00
48	" " Blind, Brantford	36,000 00	35,624 00	.....	376 00
49	Andrew Mercer Reformatory for Women and Refuge for Girls, Toronto	30,626 00	29,206 00	.....	1,420 00
		838,624 00	834,968 00	25,107 00	28,763 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
39	DETAILS.		
	ASYLUM FOR INSANE, TORONTO.		
	(For 710 patients.)	$ cts	$ cts.
	Salaries.	No. of Officers and Employees.	
	Medical Superintendent	1	2,000 00	2,000 00
	Assistant "	1	1,100 00	1,100 00
	Second Assistant	1	700 00	800 00
	Bursar	1	1,400 00	1,400 00
	Bursar's Clerk	1	800 00	675 00
	Clerk	1	624 00	.....
	Steward	1	750 00	750 00
	Storekeeper	1	800 00	800 00
	Assistant Storekeeper	1	700 00	700 00
	Engineer	1	740 00	740 00
	Stokers	3	828 00	828 00
	Engine-driver for laundry	1	300 00	300 00
	Bricklayer and Mason	1	625 00	625 00
	Carpenters	2	1,150 00	1,150 00
	Gardener	1	400 00	400 00
	Assistant Gardener	1	300 00	300 00
	Porter	1	275 00	275 00
	Baker	1	400 00	400 00
	Assistant Baker	1	216 00	216 00
	Tailor	1	625 00	600 00
	Teamster	1	240 00	240 00
	Night Watchers	4	1,008 00	1,008 00
	Chief Attendants	8	2,400 00	2,400 00
	Ordinary Male Attendants	19	4,560 00	4,560 00
	Painter and Jobber	1	575 00	575 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses, 1891. $ cts.	Salaries and Expenses, 1892. $ cts.
39	ASYLUM FOR THE INSANE, TORONTO—*Continued.*			
	FEMALES.			
	Matron	1	500 00	500 00
	Assistant Matron	1	300 00	300 00
	Chief Attendants	6	996 00	996 00
	Ordinary "	21	3,150 00	3,150 00
	Night "	4	600 00	600 00
	Cooks	5	672 00	672 00
	Laundresses	6	684 00	684 00
	Housemaids	4	396 00	396 00
	Seamstress	1	132 00	132 00
	Dairymaid	1	120 00	120 00
		106	31,066 00	30,392 00
	Expenses.			
	Medicine and Medical comforts		550 00	550 00
	Fuel		11,400 00	10,400 00
	Butchers' meat, fish and fowl		15,000 00	15,000 00
	Flour, meal, etc		6,500 00	6,500 00
	Butter		4,000 00	3,500 00
	Gas and Oil		2,500 00	2,500 00
	Water Supply		3,000 00	2,800 00
	Groceries		9,500 00	9,500 00
	Fruit and vegetables		2,500 00	4,000 00
	Bedding, clothing and shoes		5,000 00	4,500 00
	Furniture and furnishings		1,500 00	1,500 00
	Laundry, soap and cleaning		1,200 00	1,200 00
	Farm, feed and fodder		4,000 00	4,000 00
	Miscellaneous		900 00	900 00
	Repairs and alterations		2,500 00	2,500 00
	Printing, postage and stationery		700 00	700 00
			101,816 00	109,442 00
	MIMICO BRANCH.			
40	(For 560 patients.)			
	Salaries.	No. of Officers and Employés.		
	Assistant Superintendent	1	1,000 00	1,400 00
	Assistant Physician	1	.....	800 00
	Bursar (formerly Storekeeper at Toronto Asylum)	1	.....	1,000 00
	Assistant Steward and Storekeeper	1	400 00	500 00
	Farmer and Assistant	2	652 00	652 00
	Engineer at pump house	1	500 00	500 00
	Assistant Engineer	1	300 00	300 00
	Electrician	1	300 00	300 00
	Attendant at sewage works	1	.....	240 00
	Carpenter	1	360 00	500 00
	Jobber and Carpenter	1	144 00	144 00
	Baker	1	400 00	400 00
	Firemen	3	720 00	720 00
	Male Supervisors (4 in 1891)	6	1,152 00	1,440 00
	Male Attendants (8 in 1891)	11	1,920 00	2,640 00
	Gardener	1	.....	300 00
	Night Watch	1	240 00	240 00
	Messenger	1	240 00	240 00
	Females.			
	Matron	1	.....	350 00
	Assistant Matron	1	250 00	250 00
	Supervisors (4 in 1891)	5	648 00	810 00
	Attendants (8 in 1891)	12	1,200 00	1,800 00
	Laundresses	3	360 00	360 00
	Night Watch (1 in 1891)	2	150 00	300 00
	Cooks	3	408 00	408 00
	Seamstress (1 in 1891	2	132 00	264 00
		64	11,476 00	16,858 00
	Expenses.			
	Medicine and medical comforts		300 00	500 00
	Fuel		6,000 00	13,000 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
40	INSANE ASYLUM, TORONTO (MIMICO BRANCH)—*Continued.*		$ cts.	$ cts.
	Expenses—Continued.			
	Butchers' meat, fish and fowl		8,000 00	10,000 00
	Flour, meal, etc		4,000 00	5,000 00
	Butter		2,400 00	2,400 00
	Lighting		500 00	700 00
	Groceries		6,000 00	7,000 00
	Fruit and vegetables		1,000 00	1,500 00
	Bedding, clothing and shoes		4,000 00	5,000 00
	Furniture and furnishings		1,200 00	1,200 00
	Farm feed and fodder		1,500 00	1,500 00
	Printing, postage and stationery		250 00	300 00
	Laundry, soap, etc		500 00	700 00
	Miscellaneous		500 00	1,000 00
	Repairs and alterations		500 00	500 00
41	ASYLUM FOR THE INSANE, LONDON.		48,126 00	67,158 00
	(For 950 patients.			
	Salaries.	No. of Officers and Employés.		
	Medical Superintendent	1	2,000 00	2,000 00
	First Assistant Physician	1	1,100 00	1,100 00
	Second "	1	1,000 00	1,000 00
	Third "	1	800 00	700 00
	Bursar	1	1,400 00	1,400 00
	Bursar's Clerk	1	800 00	800 00
	Storekeeper	1	800 00	800 00
	Assistant Storekeeper	1	600 00	600 00
	Engineer	1	740 00	706 00
	Assistant Engineer	1	400 00	400 00
	Stokers	7	1,776 00	1,776 00
	Bricklayer and Plasterer	1	600 00	600 00
	Carpenters	2	1,050 00	1,050 00
	Tailor	1	460 00	460 00
	Gardener	1	450 00	450 00
	Assistant Gardener	1	300 00	300 00
	Butcher	1	240 00	240 00
	Yardman	1	216 00	216 00
	Porter and Messenger	1	216 00	216 00
	Baker	1	400 00	400 00
	Assistant Baker	1	216 00	216 00
	Farmer	1	600 00	600 00
	Assistant Farmer	1	360 00	360 00
	Ploughmen	2	432 00	432 00
	Chief Attendants	3	936 00	936 00
	Supervisors	8	2,148 00	2,148 00
	Ordinary Male Attendants	30	7,260 00	7,260 00
	Cowman	1	216 00	216 00
	Laundryman	1	240 00	240 00
	FEMALES.			
	Matron	1	500 00	500 00
	Assistant Matron	1	300 00	300 00
	Chief Attendant	1		
	Nurse	1		
	Supervisors	6	5,586 00	5,586 00
	Ordinary Female Attendants	24		
	Night Attendants	3		
	Cooks and Assistant Cooks	5	660 00	660 00
	Laundresses	4	564 00	564 00
	Housemaids	9	1,032 00	1,032 00
	Dairymaid	1	120 00	120 00
	Seamstress	1	120 00	144 00
	Portress, type writer, etc	1	144 00	144 00
		133	36,782 00	36,666 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
41	ASYLUM FOR THE INSANE, LONDON—*Continued.*		$ cts.	$ cts.
	Expenses.			
	Medicine and medical comforts		700 00	700 00
	Fuel		15,500 00	15,500 00
	Butchers' meat, fish and fowl		15,000 00	15,000 00
	Flour		8,500 00	8,500 00
	Butter		7,000 00	7,000 00
	Gas and oil		3,000 00	2,500 00
	Groceries		12,000 00	11,000 00
	Fruit and vegetables		1,000 00	600 00
	Bedding, clothing and shoes		15,500 00	15,500 00
	Furniture and furnishings		3,500 00	3,500 00
	Laundry, soap and cleaning		2,000 00	2,000 00
	Farm, feed and fodder		5,000 00	4,500 00
	Miscellaneous		2,000 00	2,000 00
	Repairs and alterations		6,000 00	5,000 00
	Printing, postage and stationery		1,000 00	1,000 00
			134,482 00	130,966 00
42	ASYLUM FOR THE INSANE, KINGSTON.			
	(For 570 Patients.)			
	Salaries.	No. of Officers and Employés.		
	Medical Superintendent	1	2,000 00	2,000 00
	Assistant Physician	1	1,100 00	1,100 00
	Second Assistant Physician	1	700 00	750 00
	Bursar	1	1,300 00	1,300 00
	Clerk	1	800 00	800 00
	Steward	1	600 00	600 00
	Storekeeper	1	700 00	700 00
	Engineer	1	740 00	740 00
	Assistant Engineer	1	300 00	300 00
	Carpenter	1	500 00	500 00
	Baker	1	400 00	400 00
	Tailor	1	500 00	500 00
	Attendant Tradesman 3 Supervisors 9 Ordinary Attendants 10 Night Watches 2	24	7,036 00	7,036 00
	Farmer	1	400 00	400 00
	Gardener	1	400 00	400 00
	Butcher	1	240 00	240 00
	Stokers	2	425 00	425 00
	Ploughman	1	360 00	360 00
	Laundryman	1	240 00	240 00
	Stableman and Messenger	1	216 00	216 00
	FEMALES.			
	Matron	1	450 00	450 00
	Assistant Matron	1	250 00	275 00
	Trained Nurse for Infirmary	1	210 00	210 00
	Seamstress	1	120 00	120 00
	Supervisors 7 Attendants 11 Night Watches 1	19	2,982 00	2,982 00
	Porteress	1	120 00	120 00
	Cooks	3	408 00	408 00
	Laundresses	2	264 00	264 00
	Servants, Dairymaid, etc.	3	336 00	336 00
		76	24,097 00	24,172 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
42	ASYLUM FOR THE INSANE, KINGSTON—*Continued.*	$ cts.	$ cts.
	Expenses.		
	Medicines	600 00	600 00
	Butchers' meat, fish and fowl	10,000 00	10,000 00
	Butter	3,000 00	3,000 00
	Flour, bread, etc	5,500 00	5,500 00
	Fuel	11,000 00	11,000 00
	Gas and oil	800 00	800 00
	Groceries	7,500 00	7,500 00
	Fruit and vegetables	2,000 00	2,000 00
	Bedding, clothing and shoes	4,500 00	4,500 00
	Furniture and furnishings	1,200 00	1,200 00
	Laundry, soap and cleaning	900 00	900 00
	Printing, postage and stationery	900 00	900 00
	Farm, feed and fodder	2,500 00	2,500 00
	Repairs	2,400 00	2,400 00
	Unpaid rent of Regiopolis College	.....	1,200 00
	Miscellaneous	1,500 00	1,500 00
		78,397 00	79,672 00
43	ASYLUM FOR THE INSANE, HAMILTON.		
	(For 900 patients)		
	Salaries. — No. of Officers and Employés.		
	Medical Superintendent	1	2,000 00	2,000 00
	Assistant Physician	1	1,100 00	1,100 00
	Second Assistant Physician (in new building)	1	900 00	900 00
	Third do	1	700 00	800 00
	Bursar	1	1,400 00	1,400 00
	Bursar's Clerk	1	800 00	800 00
	Storekeeper	1	800 00	800 00
	Engineer	1	650 00	650 00
	Assistant Engineer	1	300 00	300 00
	Stokers	5	1,200 00	1,200 00
	Carpenters	2	1,050 00	1,050 00
	Baker	1	450 00	450 00
	Gardener	1	500 00	500 00
	Assistant in store	1	600 00	600 00
	Porter and Gatekeeper	1	250 00	250 00
	Chief Attendant	1	300 00	300 00
	Night Watch, Chief	1	365 00	365 00
	do	2	480 00	480 00
	Ordinary Male Attendants	28	6,972 00	6,972 00
	Tailor	1	500 00	500 00
	Farmer	1	600 00	600 00
	Butcher	1	240 00	240 00
	Ploughman	1	240 00	240 00
	Messenger and Stableman	1	240 00	240 00
	Yardman	1	240 00	240 00
	Farm hand	1	180 00	180 00
	Laundryman	1	300 00	300 00
	Shoemaker	1	300 00	300 00
	Cowman	1	180 00	180 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.		Voted for. 1891.	Voted for. 1892.
43	ASYLUM FOR THE INSANE, HAMILTON—*Continued.*		$ cts.	$ cts.
	FEMALES.			
	Matron	1	500 00	500 00
	Assistant Matron	1	300 00	300 00
	Chief Attendant	1	250 00	250 00
	Supervisors	9	1,566 00	1,566 00
	Ordinary Female Attendants	17	2,550 00	2,550 00
	Night Watchers	3	450 00	450 00
	Cooks (two additional)	7	888 00	888 00
	Laundresses	3	384 00	384 00
	Housemaids	4	444 00	444 00
	Seamstresses	2	288 00	288 00
		110	31,457 00	31,557 00
	Expenses.			
	Medicines and medical comforts		600 00	600 00
	Fuel (about $9,000 of 1891 paid for account of 1890)		26,500 00	17,500 00
	Butchers' meat, fish and fowl		17,000 00	15,500 00
	Flour, bread, etc		8,000 00	8,000 00
	Butter		7,000 00	7,000 00
	Gas and oil		3,000 00	3,000 00
	Groceries		14,500 00	14,500 00
	Fruit and vegetables		1,800 00	1,800 00
	Bedding, clothing and shoes		9,200 00	8,000 00
	Laundry, soap and cleaning		2,000 00	2,000 00
	Furniture and furnishings		2,000 00	2,000 00
	Farm, feed and fodder		3,500 00	1,500 00
	Repairs and alterations		4,500 00	3,500 00
	Miscellaneous, including rents, etc		3,500 00	3,500 00
	Water supply		1,700 00	1,700 00
	Printing, postage and stationery		1,200 00	1,200 00
			137,457 00	122,857 00
44	ASYLUM FOR IDIOTS, ORILLIA.			
	For 500 Patients.			
	Salaries.	No. of Officers and Employés.		
	Medical Superintendent	1	1,600 00	1,800 00
	Bursar	1	1,000 00	1,100 00
	Storekeeper	1	700 00	700 00
	Engineers	3	1,400 00	1,400 00
	Gardener	1	300 00	300 00
	Chief Attendant	1	300 00	300 00
	Night Watchers	2	605 00	605 00
	Ordinary Male attendants	8	1,920 00	1,920 00
	Messenger, Porter and Stable-keeper	2	480 00	480 00
	Carpenter	1	500 00	500 00
	Farmer	1	450 00	450 0
	Stokers	4	960 00	960 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
	ASYLUM FOR IDIOTS, ORILLIA—*Continued.*		$ cts.	$ cts.
	FEMALES.			
	Matron	1	450 00	450 00
	Assistant Matron	1	300 00	300 00
	Teachers for feeble-minded children, (two additional)	5	1,050 00	1,550 00
	Ordinary Female Attendants	13	1,950 00	1,950 00
	Night Attendants	2	300 00	300 00
	Cooks	4	528 00	528 00
	Laundresses	2	264 00	264 00
	Housemaids	9	1,080 00	1,080 00
	Seamstresses	2	300 00	300 00
	Dairymaid	1	120 00	120 00
		66	16,557 00	17,357 00
	Expenses.			
	Medicine and medical comforts		120 00	120 00
	Fuel		12,000 00	15,500 00
	Butchers' meat, fish and fowl		5,000 00	5,000 00
	Flour, bread, etc		5,500 00	5,500 00
	Butter		2,500 00	2,500 00
	Gas and oil		600 00	600 00
	Groceries		4,000 00	4,000 00
	Fruit and vegetables		1,500 00	2,000 00
	Bedding, clothing and shoes		4,000 00	4,000 00
	Laundry, soap and cleaning		1,200 00	1,200 00
	Furniture and furnishings		1,250 00	1,250 00
	Farm, feed and fodder		2,125 00	2,125 00
	Repairs		1,600 00	1,600 00
	Miscellaneous		1,500 00	1,500 00
	Printing, postage and stationery		750 00	750 00
			60,202 00	65,002 00
45	CENTRAL PRISON, TORONTO.			
	For 375 Prisoners.			
	Salaries.	No. of Officers and Employés.		
	Warden	1	2,000 00	2,000 0
	Deputy Warden	1	1,400 00	1,400 00
	Bursar	1	1,300 00	1,300 00
	Physician	1	1,000 00	1,000 00
	Clerk and Prison Librarian	1	850 00	850 00
	Steward and Storekeeper	1	800 00	800 00
	Clerk (one-half charged to Industrial Department		400 00	400 00
	Guards	20	12,825 00	11,200 00
	Engineer	1	890 00	890 00
	Baker	1	600 00	600 00
		28	22,065 00	20,440 00
	Expenses.			
	Hospital expenses and medicines		500 00	400 00
	Butchers' meat and fish		8,500 00	8,500 00
	Flour, bread and meal		5,500 00	5,500 00
	Groceries		5,000 00	5,000 00
	Bedding, clothing and shoes		6,000 00	6,000 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
45	CENTRAL PRISON, TORONTO—*Continued.*			
	Expenses—Continued.		$ cts.	$ cts.
	Fuel		5,200 00	6,000 00
	Gas and oil		1,100 00	1,100 00
	Water supply		3,000 00	2,000 00
	Laundry, soap and cleaning		2,000 00	2,000 00
	Stationery, advertising, printing and postage		550 00	550 00
	Library, schools and expenses of religious services		1,000 00	1,000 00
	Furniture and furnishings		1,000 00	800 00
	Stable, forage, etc		1,500 00	1,200 00
	Grounds		450 00	450 00
	Repairs, etc		1,600 00	1,600 00
	Unenumerated		2,000 00	2,000 00
			66,965 00	64,540 00
	INDUSTRIAL DEPARTMENT.			
	Salaries.	No. of Officers and Employés.		
	Clerk (one half charged to Maintenance)	1	400 00	400 00
	Shoemaker, without allowance for rent	1	600 00	800 00
	Tailor do do	1	600 00	800 00
	Foremen and Instructors	14	9,880 00	9,850 00
	Night Watch and Assistant Engineer	1	450 00	600 00
	Material	..	47,000 00	45,000 00
		18	125,895 00	121,990 00
46	ONTARIO REFORMATORY FOR BOYS, PENETANGUISHENE.			
	For 200 Inmates.			
	Salaries.	No. of Officers and Employés.		
	Superintendent	1	1,600 00	1,800 00
	Assistant Superintendent	1	950 00	950 00
	Bursar	1	900 00	900 00
	Surgeon	1	700 00	700 00
	Chaplains	2	1,200 00	1,200 00
	Steward and Storekeeper	1	800 00	800 00
	Chief Guard (for night duty)	1	500 00	500 00
	School Teachers	3	1,650 00	1,650 00
	Carpenter Instructor	1	600 00	600 00
	Engineer	1	600 00	600 00
	Baker and Cook	1	450 00	450 00
	Instructors in shoe and tailor shop	2	1,150 00	1,150 00
	Farmer	1	450 00	450 00
	Gardener	1	400 00	400 00
	Ordinary Guards	4	1,700 00	1,700 00
	Night Guards	4	2,000 00	1,600 00
	Guard at out-buildings	1	400 00	400 00
	Gate-keeper	1	400 00	400 00
	Organists	2	160 00	160 00
	FEMALES.			
	Laundress, etc	1	240 00	240 00
		31	16,850 00	16,650 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses. 1891.	**1892.**
46	ONTARIO REFORMATORY FOR BOYS, PENETANGUISHENE—*Continued.*		$ cts.	$ cts.
	Expenses.			
	Rations		6,000 00	5,800 00
	Clothing		5,500 00	4,600 00
	Farm, farm stock and stables		2,200 00	2,000 00
	Hospital		200 00	100 00
	Library and schools		600 00	400 00
	Fuel		4,000 00	3,000 00
	Cleaning, light and laundry		800 00	500 00
	Furniture, tools and shop fixtures		900 00	800 00
	Workshops, tools and fixtures		400 00	300 00
	Repairs, ordinary		1,500 00	1,500 00
	Incidentals (recaptures, freight, rent, etc)		2,200 00	2,000 00
	Postage and stationery, printing and advertising		500 00	400 00
			41,650 00	38,050 00
47	INSTITUTE FOR THE DEAF AND DUMB, BELLEVILLE.			
	For 250 pupils.			
	Salaries.			
	Superintendent	1	1,600 00	1,800 00
	Physician	1	650 00	650 00
	Bursar	1	850 00	850 00
	Matron and Housekeeper	1	400 00	450 00
	Teachers	15	9,250 00	9,100 00
	Storekeeper and Clerk	1	650 00	650 00
	Engineer	1	600 00	600 00
	Stoker	1	300 00	300 00
	Farmer	1	400 00	400 00
	Teamster	1	216 00	240 00
	Gardener	1	300 00	300 00
	Baker	1	425 00	425 00
	Night Watchman	1	300 00	300 00
	Carpenter and Assistant	2	750 00	750 00
	Shoemaker	1	550 00	550 00
	Messenger	1	168 00	192 00
	Cook	1	168 00	168 00
	Small Boy's and Girl's Nurses	2	240 00	240 00
	Maid, Laundresses and Cook's Assistant	12	1,356 00	1,356 00
	Supervisor of Boys	1	550 00	550 00
	Printing Instructor and Assistant Supervisor of Boys	1	300 00	550 00
	Seamstress and Supervisor of Girls	1	300 00	300 00
		49	20,323 00	20,721 00
	Expenses.			
	Medicines and Medical Comforts		200 00	200 00
	Butchers' meat, fish and fowl		4,200 00	4,200 00
	Flour		2,200 00	2,200 00
	Butter		2,400 00	2,300 00
	Groceries		2,600 00	2,500 00
	Fruit and vegetables		500 00	500 00
	Bedding, clothing and shoes		900 00	900 00
	Fuel		3,900 00	3,800 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.			Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
47	INSTITUTE FOR DEAF AND DUMB, BELLEVILLE—*Continued.*			$ cts.	$ cts.
	Expenses—Continued.				
	Gas and oil			1,200 00	1,200 00
	Laundry, soap and cleaning			400 00	400 00
	Furniture and furnishings			600 00	600 00
	Farm, feed and fodder			700 00	700 00
	Repairs and alterations			900 00	900 00
	Advertising, printing, stationery and postage			750 00	650 00
	Books, apparatus and appliances			700 00	700 00
	Unenumerated			1,500 00	1,500 00
				43,973 00	43,971 00
48	INSTITUTION FOR THE BLIND, BRANTFORD.				
	(For 130 pupils.)				
	Salaries.	No. of Officers and Employés.			
	Principal	1	....	1,600 00	1,800 00
	Physician	1	....	600 00	600 00
	Bursar	1	....	900 00	900 00
	Matron	1	....	400 00	400 00
	Teachers	10	....	7,000 00	7,000 00
	Trade Instructor	1	....	1,100 00	1,100 00
	Visitors' attendant	1	....	156 00	156 00
	Carpenter	1	....	424 00	424 00
	Engineer	1	....	600 00	600 00
	Assistant Engineer	1	....	500 00	500 00
	Fireman in winter and farm hand in summer	1	....	300 00	300 00
	Gardener	1	....	400 00	400 00
	Farmer and Teamster	1	....	288 00	312 00
	Porter and Messenger	1	....	216 00	216 00
	Cook and Baker	2	....	568 00	568 00
	Cook's Assistant	1	....	120 00	120 00
	Maids	10	....	984 00	984 00
	Laundress	1	....	168 00	168 00
	Laundress's Assistants	2	...	216 00	216 00
	Nurses	3	....	410 00	410 00
	Nightwatchman	1	....	300 00	350 00
	Temporary assistance, including extra farm hands in summer	..	....	350 00	300 00
		49		17,600 00	17,824 00
	Expenses.				
	Medicine and medical comforts			200 00	200 00
	Butcher's meat, fish and fowl			3,100 00	3,200 00
	Flour, bread, etc			1,100 00	1,000 00
	Butter			1,200 00	1,100 00
	General groceries			2,000 00	2,000 00
	Fruit and vegetables			300 00	300 00
	Bedding, clothing and shoes			700 00	700 00
	Fuel			3,200 00	3,000 00
	Gas, oil and candles			1,200 00	1,100 00
	Laundry, soap and cleaning			300 00	300 00
	Furniture and furnishings			500 00	500 00
	Farm, feed and fodder			900 00	800 00
	Repairs and alterations			600 00	600 00
	Advertising, printing, stationery and postage			600 00	600 00
	Books, apparatus and appliances			1,100 00	1,000 00
	Unenumerated			1,400 00	1,400 00
				36,000 00	35,624 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1891.	**1892.**
49	ANDREW MERCER REFORMATORY FOR FEMALES AND REFUGE FOR GIRLS, TORONTO.			
	(For 130 inmates.)		$ cts.	$ cts.
	Salaries.	No. of Officers and Employés.		
	Superintendent	1	1,000 00	1,000 00
	Deputy Superintendent	1	600 00	600 00
	Secretary	1	350 00	350 00
	Physician	1	800 00	800 00
	Bursar and Storekeeper	1	900 00	900 00
	Teacher and Housekeeper for Refuge	1	550 00	550 00
	Instructors	3	700 00	.....
	Attendants and servants	14	1,380 00	2,356 00
	Gatekeeper and Visitors' Attendant	1	120 00	.....
	Cook and Baker	1	168 00	.....
	Chief Attendant	1	200 00	.....
	Maid	1	108 00	.....
	Engineer	1	600 00	600 00
	Assistant Engineer	1	500 00	500 00
	Night Watch	1	400 00	400 00
	" (females)	1	200 00	.....
	Messenger	1	400 00	400 00
	Outside Night Watch	1	400 00	400 00
	Gardener	1	400 00	400 00
		34	9,776 00	9,256 00
	Expenses.			
	Hospital expenses and medicines		200 00	200 00
	Butchers' meat and fish		2,000 00	2,000 00
	Flour, bread and meal		1,600 00	1,500 00
	Groceries		3,500 00	3,500 00
	Bedding, clothing and shoes		2,000 00	2,000 00
	Fuel		3,000 00	3,000 00
	Gas and oil		800 00	600 00
	Laundry, soap, cleaning and water		2,200 00	1,600 00
	Stationery, advertising, postage, etc		300 00	350 00
	Library, schools and lectures		450 00	400 00
	Furniture and furnishings		600 00	600 00
	Grounds and garden		800 00	800 00
	Repairs		400 00	400 00
	Unenumerated		1,200 00	1,200 00
	For manufacturing operations		1,500 00	1,500 00
	Feed and forage		300 00	300 00
			30,626 00	29,206 00

VI.—IMMIGRATION.

To be voted per Statement (A)..... $10,000 00.

No. of Vote.	A	1891.	1892.
		$ cts.	$ cts.
50	Agencies in Europe	4,400 00	4,400 00
	Agencies in Ontario	600 00	600 00
	Allowance for maps, circulars and literature	1,000 00	2,000 00
	To encourage new settlers on Rainy River	2,000 00	1,000 00
	Incidentals	2,000 00	2,000 00
		10,000 00	10,000 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
		$ cts.	$ cts.
50	DETAILS.		
	AGENCIES IN EUROPE.		
	Agent in Liverpool	2,000 00	2,000 00
	Clerk	240 00	240 00
	Travelling expenses	500 00	500 00
	Printing and contingencies	1,000 00	1,000 00
	Office rent and expenses, including fuel, stationery, etc	660 00	660 00
		4,400 00	4,400 00
	AGENCIES IN ONTARIO.		
	Allowance for constable at railway station and shed	600 00	600 00
		600 00	600 00

VII.—AGRICULTURE.

To be voted per Statement (A) ..... $173,295 00.

No. of Vote.	A	1891.	1892.
		$ cts.	
51	Agriculture	145,688 00	173,295 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
51	Details.	$ cts.	$ cts
	(a) Agriculture.		
	Electoral Division Societies, 87 at $700 (86 in 1891)	60,200 00	60,900 00
	" 1 at 550	550 00	550 00
	" 4 at 350	1,400 00	1,400 00
	" Outlying Districts	2,000 00	2,000 00
	Additional grant to 87 Electoral District Societies	.....	8,700 00
	Fruit Growers' Association	1,800 00	1,800 00
	Entomological Society	1,000 00	1,000 00
	Dairymen's Associations	4,000 00	4,000 00
	Western Dairymen's Association for Dairy School and Milk Inspection ..	500 00	
	Agricultural and Arts Associations	5,350 00	5,500 00
	Dominion Sheep-Breeder's Association	300 00	300 00
	Swine-Breeder's Association	300 00	300 00
	Ontario Experimental Union	400 00	400 00
	Ontario Creameries Association	1,500 00	1,500 00
	Ontario Poultry Association	1,300 00	1,300 00
	Beekeepers' Association and inspection	1,100 00	1,100 00
	Travelling expenses of Professors attending Farmers' Institutes, conventions, etc	600 00	800 00
	Travelling expenses and allowances for other Lecturers at Farmer's Institutes	1,800 00	1,800 00
	Farmers' Institutes, a grant of $25 to one Institute in each Electoral District, on condition that an equal sum be granted by the County Council, and on such further conditions as may be imposed by regulations of Commissioner of Agriculture	2,000 00	2,000 00
	Provincial Institute	1,600 00	1,600 00
	For sundry services in connection with Agriculture and Arts—such as investigations of disease in animals and crops, and of ravages of insects; printing and distributing reports and bulletins, and for agricultural instruction, dairy products, travelling expenses and contingencies, not otherwise provided for	6,000 00	8,000 00
	Forestry	2,000 00	2,000 00
	Tree-planting—Bonus to Municipalities under 46 Vic., chap. 36	1,000 00	1,000 00
	Bureau of Statistics.		
	Printing, stationery, postage, and collection of statistics	6,500 00	6,500 00
		103,200 00	114,450 00
	Ontario Agricultural and Experimental Farm. (130 Students.) *I. College.—(a) Salaries and Wages.*		
	President	2,000 00	2,000 00
	Professor of Agriculture and Farm Superintendent	2.000 00	2,000 00

VII.—AGRICULTURE.—*Continued.*

No. of Vote.	SERVICE.	Voted for. 1891.	Voted for. 1892.
51	ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.—*Continued.*	$ c.	$ c.
	(a) *Salaries and Wages.*		
	Professor of Chemistry	1,700 00	1,700 00
	" Geology and Natural History	1,800 00	1,800 00
	" Dairy Husbandry	1,200 00	1,300 00
	" Veterinary Science (part time)	1,000 00	1,000 00
	Mathematical and Assistant Resident Master	1,000 00	1,000 00
	Assistant in the Department of Chemistry	800 00	850 00
	Instructor in Drill and Gymnastics (part time)	150 00	200 00
	Bursar	950 00	950 00
	Shorthand writer and tutor	400 00	500 00
	Physician	300 00	300 00
	Matron and Housekeeper	400 00	400 00
	Engineer	700 00	800 00
	Assistant Engineer for 6 months (4 months in 1891)	144 00	240 00
	Stoker, 8 months (6 months in 1889)	176 00	192 00
	Janitor and Messenger	264 00	288 00
	Night Watchman and Assistant in looking after Students in Boarding-house for nine months	225 00	225 00
	Temporary assistance	100 00	100 00
		15,309 00	15,845 00
	(b) *Expenses of Boarding House.*		
	Meat, fish and fowl	4,000 00	4,000 00
	Bread and biscuit	800 00	800 00
	Groceries, butter and fruit	4,000 00	4,000 00
	Laundry, soap and cleaning	300 00	300 00
	Women servants for boarding-house—Cooks, laundresses, etc	1,700 00	1,700 00
	Advertising, printing, postage and stationery	800 00	800 00
	Maintenance of chemicals, apparatus, etc	250 00	300 00
	Library (books, papers and periodicals)	300 00	300 00
	Medals	100 00	100 00
	Unenumerated	700 00	700 00
		28,259 00	28,845 00
	Less estimated revenue	6,000 00	5,000 00
		22,259 00	23,845 00
	II.—EXPERIMENTAL FARM.		
	(a) *Farm Proper.*		
	1. Permanent improvements—addition to waggon shed, fencing, grading, etc	1,000 00	3,586 00
	2. Farm maintenance—	$ c. $ c.	
	Salary of Farm Foreman ($400 for instruction)	800 00 850 00	
	Cattlemen ($150 for instruction)	450 00 500 00	
	Assistant cattleman	300 00	
	Wages	2,650 00 3,005 00	
	Hire of horse labor	100 00	
	Live stock	4,500 00 4,012 00	
	Maintenance of stock	2,500 00 4,950 00	
	Seed	200 00 240 00	
	Manure (fertilizers)	250 00 100 00	
	Binding twine	50 00 50 00	
	Repairs and alterations	450 00 372 00	
	Furniture and furnishings	250 00 250 00	
	Tools and implements	580 00 340 00	

VII.—AGRICULTURE.—*Continued.*

No. of Vote.	SERVICE.			Voted for. 1891.	Voted for. **1892.**
				$ c.	$ c.
51	II.—Experimental Farm.—*Continued.*				
	(*a*) *Farm Proper.*				
		$ c.	$ c.		
	Advertising, printing, postage and stationery..	400 00	530 00		
	Fuel, light, etc	40 00	250 00		
	Contingencies	250 00	500 00		
		13,370 00	16,349 00		
	Less estimated revenue	6,000 00	8,000 00		
				7,370 00	8,349 00
	(*b*) *Experiments.*			8,370 00	11,935 00
	Salaries and wages—				
	Assistant Director	1,000 00	1,200 00		
	Special Assistant ($100 chargeable to Farm and $100 to instruction)	400 00	420 00		
	Experimental feeder	400 00	450 00		
	2 regular experimental laborers		600 00		
	Teamster for 7 months		210 00		
	Additional labor	1,185 00	1,045 00		
		2,985 00	3,925 00		
	Seeds	200 00	400 00		
	Manure and special fertilizers	175 00	175 00		
	Team of horses and stock for feeding	400 00	350 00		
	Furniture, furnishing and repairs	200 00	400 00		
	Printing, postage and stationery	100 00	125 00		
	Implements	175 00	415 00		
	Feed and fodder	100 00	50 00		
	Exhibitions	250 00	50 00		
	Contingencies		250 00		
				4,585 00	6,140 00
	III.—Experimental Dairy.				
	(*a*) *Maintenance.*				
	Salary of assistant—to make butter, instruct students, etc	400 00	500 00		
	Laborers for milking and feeding stock, etc		460 00		
	Temporary assistance	100 00	150 00		
		500 00	1,110 00		
	Purchase of cows and pigs	450 00	1,000 00		
	Feed for do do	500 00	900 00		
	Furniture, furnishing and repairs	150 00	200 00		
	Laboratory expenses, gas, chemicals, etc	50 00	50 00		
	Advertising, printing, postage and stationery..	90 00	150 00		
	Contingencies	100 00	140 00		
		1,840 00	3,550 00		
	Less estimated revenue	800 00	1,000 00		
				1,040 00	2,550 00
	(*b*) *Capital Account.*				
	Dairy appliances—for fitting up new butter and cheese rooms, extractor, accumulator, separator, curd mill, vats, etc	460 00	1,200 00		
	Expenses *re* travelling dairy	500 00	5,600 00		
				960 00	6,800 00

VII.—AGRICULTURE.—*Continued.*

No. of Vote.	SERVICE.			Voted for. 1891.	**1892.**
	IV.—Poultry Department.			$ cts.	$ c
51	Salary of Manager	500 00	600 00		
	Furnishings, boiler, utensils ,etc	.....	100 00		
	Feed, etc	200 00	200 00	700 00	900 00
	V.—Nursery, Forest Tree Plantation, Orchard, Arboretum, Vineyard, Vegetable Garden and Lawn (63 acres).				
	Foreman's salary	700 00	700 00		
	Gardener	456 00	480 00		
	Assistant Gardener	.....	380 00		
	Assistant Gardener (8 months in 1891) 6 months	288 00	240 00		
	Teamster	320 00	325 00		
	Laborers	1,100 00	1,350 00		
	Manure	100 00	150 00		
	Trees, seeds, bulbs and plants	200 00	550 00		
	Furnishings, implements, tools, flower pots and repairs	150 00	350 00		
	Fuel and light	30 00	450 00		
	Contingencies	50 00	100 00	3,394 00	5,075 00
	VI.—Mechanical Department.				
	Salary of foreman	700 00	700 00		
	Lumber, nails, oil, paint, etc	300 00	150 00		
	Tools, etc	100 00	100 00		
	Fuel and light	30 00	25 00		
	Contingencies	50 00	25 00		
	Extra carpenter for erection of buildings	.....	600 00	1,180 00	1,600 00
				20,229 00	35,000 00

VIII.—HOSPITALS AND CHARITIES.

To be voted per Statement (A)..... $151,715 73.

No. of Vote.	A.	1891.	**1892.**
		$ cts.	$ cts.
52	For Hospitals and Institutes mentioned in Schedule "A" of Statute	75,480 53	89,002 50
	For Institutions, Schedule "B"	41,343 00	45,850 04
	" " "C"	17,877 81	16,563 19
	For printing, stationery and other contingencies connected with above Institutes	300 00	300 00
	County Houses of Refuge	32,750 00	.....
	Total	167,751 34	151,715 73

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS.

To be voted per Statement (A) .....$59,898.00.

No. of Vote.	A.	1891.	1892.
		$ cts.	$ cts.
53	Government House	7,500 00	7,500 00
54	Parliament Buildings—Main building	9,900 00	9,900 00
55	" " West wing	2,800 00	1,800 00
56	" " East wing	4,050 00	3,050 00
57	Education Department (Normal School building)	8,700 00	9,200 00
58	Rented premises, Simcoe Street	2,700 00	2,700 00
59	" " Wellington Street	1,550 00	1,550 00
60	Miscellaneous	3,158 00	3,208 00
61	Normal School, Ottawa	3,350 00	3,350 00
62	School of Practical Science	2,000 00	2,000 00
63	Agricultural College	6,150 00	6,350 00
64	Agricultural Hall	650 00	650 00
65	Osgoode Hall	8,640 00	8,640 00
		1,148 00	59,898 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
	DETAILS.	$ cts.	$ cts.
53	*Government House.*		
	Water	650 00	650 00
	Gas	1,350 00	1,350 00
	Fuel	2,200 00	2,200 00
	Repairs	1,500 00	1,500 00
	Furnishings	1,000 00	1,000 00
	Planting and plants	500 00	500 00
	Contingencies (clearing away snow, carting ashes, etc)	300 00	300 00
		7,500 00	7,500 00
54	*Parliament Buildings—Main Building.*		
	Repairs and Furniture	6,000 00	6,000 00
	Fuel	1,600 00	1,600 00
	Gas and other lighting	1,700 00	1,700 00
	Water	600 00	600 00
		9,900 00	9,900 00

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses 1891.	Salaries and Expenses **1892.**
	DETAILS—*Continued.*	$ cts.	$ cts.
55	*Parliament Buildings, West Wing, Crown Lands Department.*		
	Repairs and furniture	1,600 00	600 00
	Fuel	700 00	700 00
	Water	500 00	500 00
		2,800 00	1,800 00
56	*East Wing, Treasury Department and Secretary and Registrar's Department.*		
	Repairs and furniture	2,500 00	1,500 00
	Fuel	750 00	750 00
	Water	500 00	500 00
	Gas	300 00	300 00
		4,050 00	3,050 00
57	*Education Department, Normal and Model Schools, Toronto.*		
	Furniture and furnishings	1,500 00	2,000 00
	Expenses of grounds	800 00	800 00
	Fuel and light	3,800 00	3,800 00
	Water	1,000 00	1,000 00
	Repairs, including museum, etc.	1,000 00	1,000 00
	Carpenter (formerly paid out of contingencies)	600 00	600 00
		8,700 00	9 200 00
58	*Rented Premises, Simcoe Street, Attorney-General's Department.*		
	Fuel, gas and water	800 00	800 00
	Rent	1,200 00	1,200 00
	Repairs and furniture	700 00	700 00
		2,700 00	2,700 00
59	*Rented Premises on Wellington Street Public Works Department.*		
	Fuel, gas and water	400 00	400 00
	Rent	600 00	600 00
	Repairs and furniture	350 00	350 00
	Caretaking, etc., departmental buildings	200 00	200 00
		1,550 00	1,550 00
60	*Miscellaneous.*		
	General Clerk of Works and repairs for Public Institutions	1,200 00	1,200 00
	Carpenter (engaged in Government buildings)	720 00	720 00
	Plumber and assistant (engaged in Government building)	1,238 00	1,288 00
		3,158 00	3,208 00

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS—*Concluded.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	Salaries and Expenses. **1892.**
	DETAILS.—*Continued.*		
61	*Normal School, Ottawa.*	$ cts.	$ cts.
	Expenses of grounds	400 00	400 00
	Fuel and light	1,600 00	1,600 00
	Water	600 00	600 00
	Repairs, furniture and incidentals	750 00	750 00
		3,350 00	3,350 00
62	*School of Practical Science.*		
	Gas	200 00	200 00
	Fuel	1,000 00	1,000 00
	Water	200 00	200 00
	Repairs, furniture and incidentals	600 00	600 00
		2,000 00	2,000 00
63	*Agricultural College.*		
	Furniture and furnishings	600 00	600 00
	Repairs and alterations	600 00	600 00
	Fuel	3,000 00	3,200 00
	Light	1,100 00	1,100 00
	Water	650 00	650 00
	Sewage disposal	200 00	200 00
		6,150 00	6,350 00
64	*Agricultural Hall.*		
	Fuel and light	650 00	650 00
		650 00	650 00
65	*Osgoode Hall.*		
	Fuel and light	5,000 00	5,000 00
	Salaries of engineer and firemen	1,140 00	1,140 00
	Water	500 00	500 00
	Repairs and furniture	2,000 00	2,000 00
		8,640 00	8,640 00

X.—PUBLIC BUILDINGS.

To be voted per Statement (A)..... $418,356 00.

No. of Vote.	A.	1892. Re-vote estimated.	1892. New vote.
		$ cts.	$ cts.
66	Asylum for the Insane, Toronto	200 00	10,730 00
67	Mimico Cottages	8,000 00	50,212 00
68	New Asylum to accommodate 500 patients	.....	70,000 00
69	Asylum for the Insane, London	9,600 00	28,525 00
70	" " " Hamilton	28,900 00	13,150 00
71	" " " Kingston	2,900 00	16,285 00
72	" Idiots, Orillia	1,750 00	2,350 00
73	Provincial Reformatory, Penetanguishene	1,400 00	500 00
74	Reformatory for Females, Toronto	100 00	3,264 00
75	Central Prison, Toronto	.....	47,550 00
76	Deaf and Dumb Institute, Belleville	3,600 00	9,980 00
77	Blind Institute, Brantford	9,800 00	2,210 00
78	Agricultural College and Experimental Farm, Guelph	12,800 00	16,000 00
79	Education Department, Normal and Model Schools, Toronto	.....	9,000 00
80	Normal School, Ottawa	14,500 00	8,000 00
81	School of Practical Science, Toronto	4,800 00	4,500 00
82	Osgoode Hall, Toronto	850 00	2,500 00
83	Government House, Toronto	700 00	.....
84	Algoma District	1,350 00	1,000 00
85	Thunder Bay District	875 00	.....
86	Muskoka District	1,600 00	1,900 00
87	Parry Sound District	1,100 00	1,800 00
88	Nipissing District	4,800 00	5,000 00
89	Rainy River District	1,000 00	3,000 00
90	Miscellaneous	275 00	.....
		110,900 00	307,456 00
	Re-votes included in above	110,900 00	.....
	Expenditure on capital account (new)	289,206 00	.....
	" for repairs	18,250 00	.....
	Total estimate for 1892	418,356 00	.....
	(Voted for 1891, $517,241.00).		

No. of Vote.	SERVICE.	To be voted for 1892. $ cts.	$ cts.
	DETAILS.		
66	ASYLUM FOR INSANE, TORONTO.		
	Re-vote of unexpended balance, general repairs, etc	200 00	
	Furniture and furnishings, (Inspector)	3,885 00	
	Alteration and improvement of main sewer	1,200 00	
	Fittings for alterations in bath rooms and closets	1,100 00	
	Hot water boiler, fittings, etc	425 00	
	Garden and grounds	470 00	
	Material for flooring, repairs and improvements	2,950 00	
	Telephone, electric battery and plates	700 00	
			10,930 00

X.—PUBLIC BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1892.	
	DETAILS—*Continued.*		
67	MIMICO COTTAGES.	$ cts.	$ cts.
	Re-vote of unexpended balance	8,000 00	
	To complete cottages under contract	30,000 00	
	Sewage disposal works, grading, etc	7,000 00	
	Bridge for front entrance road	1,000 00	
	Furniture and furnishings, two new cottages (Inspector)	4,490 00	
	do in Central building	1,250 00	
	Developing natural gas well	2,000 00	
	New laundry machinery and drying closet	1,350 00	
	Carpenter's supplies, repairs, etc	1,200 00	
	Engineer's department	207 00	
	Farm stock, implements and drain tile	465 00	
	Fencing, cedar posts, barbed wire, lumber, etc	950 00	
	Tree planting for grounds and burial plot (re-vote $100)	300 00	
			58,212 00
68	ASYLUM FOR EASTERN ONTARIO.		
	Cottages at or near Brockville to accommodate 500 patients, estimated cost of construction $250,000; required for this year's operations including site	70,000 00	
			70,000 00
69	ASYLUM FOR INSANE, LONDON.		
	Re-vote of unexpended balance	9,600 00	
	To complete slaughter house, coal shed, etc	2,000 00	
	Anuexes for six new dining-rooms, covered ways, accommodation for additional patients	20,000 00	
	Cottage for butcher, near slaughter house	1,400 00	
	Furniture and furnishings, main buildings (Inspector)	1,800 00	
	Repairs and alterations "	750 00	
	Material for fencing, green house, etc "	800 00	
	Removal and reconstruction of cow stables, etc. (Inspector)	1,500 00	
	Wringer for laundry "	275 00	
			38,125 00
70	ASYLUM FOR INSANE, HAMILTON.		
	Re-vote of unexpended balance (annexes, etc.)	18,400 00	
	Re-vote (of 1890) additional drainage	7,500 00	
	Purchase of Andrews property (re-vote)	3,000 00	
	To complete farm buildings, water tank (partly re-vote), etc	3,600 00	
	Covered ways to six dining rooms from kitchen	6,000 00	
	Furniture and furnishings (Inspector)	2,100 00	
	Material for stone cottage on farm "	400 00	
	" for repairing driving and implement sheds "	500 00	
	Telephone extension "	250 00	
	Farm and garden "	300 00	
			42,050 00
71	ASYLUM FOR INSANE, KINGSTON.		
	Re-vote of unexpended balance	2,900 00	
	To complete slaughter house, cow stable, etc	3,000 00	
	Auxiliary pump, water supply, etc., farm buildings	3,600 00	
	Furniture and furnishings (Inspector)	3,000 00	
	Developing natural gas well "	2,500 00	
	Changes in kitchen and repairs north cottage "	775 00	
	Fitting up Newcourt cottage for farm patients "	2,300 00	
	Farm and garden "	1,110 00	
			19,185 00

X.—PUBLIC BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1892.	
	DETAILS—*Continued.*	$ cts.	$ cts.
72	ASYLUM FOR IDIOTS, ORILLIA.		
	Re-vote of unexpended balance	1,750 00	
	Furniture and furnishings, farm, etc., (Inspector)	1,300 00	
	Farm and garden	1,050 00	
			4,100 00
73	REFORMATORY FOR BOYS, PENETANGUISHENE.		
	Re-vote of unexpended balance	1,400 00	
	Pointing stonework, painting, etc. (Inspector)	500 00	
			1,900 00
74	REFORMATORY FOR FEMALES.		
	Re-vote of unexpended balance	100 00	
	Portion of block paving and sewerage	514 00	
	Furniture and furnishings (Inspector)	700 00	
	Structural alterations "	100 00	
	Repairs to iron steam pipes in basement (Inspector)	1,000 00	
	Painting front of building and fence "	500 00	
	Sheeting ceilings and painting "	300 00	
	Alteration of steam pipes, old greenhouse "	150 00	
			3,364 00
75	CENTRAL PRISON, TORONTO.		
	General repairs, drains, etc	500 00	
	New well for water supply (Inspector)	1,250 00	
	Machinery for work shops, woollen mill, etc. (Inspector)	4,000 00	
	Books for library and repairs	1,300 00	
	New building for extension of industries	15,500 00	
	Machinery "	25,000 00	
			47,550 00
76	INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.		
	Re-vote of unexpended balance	2,800 00	
	To complete sewage disposal and for water supply for the Institution	2,000 00	
	Re-construction of bakery and dormitory for attendants	4,000 00	
	Furniture and furnishings (Inspector)	1,800 00	
	To complete printing plant, (re-vote)	800 00	
	Garden and grounds	530 00	
	Books for library and for pupils, etc	400 00	
	Timber for flooring boys' dormitory, class rooms, etc	1,250 00	
			13,580 00
77	INSTITUTION FOR THE BLIND, BRANTFORD.		
	Re-vote of unexpended balance, sewage disposals	9,800 00	
	Furniture and furnishings (Inspector)	260 00	
	Educational appliances	850 00	
	Repairs and alterations	800 00	
	Garden and grounds	300 00	
			12,010 00
78	AGRICULTURAL COLLEGE, GUELPH.		
	Re-vote of unexpended balance	12,800 00	
	Additional to complete Convocation Hall, etc	6,800 00	
	Furniture and furnishings	2,000 00	
	Completion of green houses	1,500 00	
	Fitting up basement of chemical Laboratory	650 00	
	Additions and alterations in Dairy Building; also new boiler and heating appliances	2,550 00	
	Materials, labor, etc., for new dairy stables and piggery	2,500 00	
			28,800 00
79	EDUCATION DEPARTMENT, NORMAL AND MODEL SCHOOLS, TORONTO.		
	General repairs, painting, drains, etc	2,000 00	
	Iron fence round grounds (2,304 feet)	6,500 00	
	Furniture and furnishings	500 00	
			9,000 00

X.—PUBLIC BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1892.	
	DETAILS—*Continued.*		
80	NORMAL SCHOOL, OTTAWA.	$ cts.	$ cts.
	Re-vote of unexpended balance	14,500 00	
	General repairs, drains, etc	2,000 00	
	Enlarging boiler house, steam heating for additions	5,500 00	
	Furniture and furnishings	500 00	
			22,500 00
81	SCHOOL OF PRACTICAL SCIENCE, TORONTO.		
	Re-vote of unexpended balance	4,800 00	
	General repairs, drains, etc	1,000 00	
	Furniture and furnishings	500 00	
	Equipment for instruction in engineering and mining	3,000 00	
			9,300 00
82	OSGOODE HALL, TORONTO.		
	Re-vote of unexpended balance	850 00	
	General repairs, painting, drains, etc	2,000 00	
	Furniture and furnishings	500 00	
			3,350 00
83	GOVERNMENT HOUSE, TORONTO.		
	Re-vote of part of unexpended balance for cottage	700 00	
			700 00
84	ALGOMA DISTRICT.		
	Re-vote of unexpended balance, lock-up, St. Joseph's Island, etc	1,350 00	
	Repairs and furniture, gaols and lock-ups	1,000 00	
			2,350 00
85	THUNDER BAY DISTRICT.		
	Re-vote of unexpended balance, repairs, etc., Lock-up	875 00	
			875 00
86	MUSKOKA DISTRICT.		
	Re-vote of unexpended balance, repairs, etc	1,600 00	
	Addition to lock-up, Bracebridge, for residence, etc	1,600 00	
	Court room and lock-up, Baysville, Townships of Maclean and Ridout to put up building to cost $750. (Contribution)	300 00	
			3,500 00
87	PARRY SOUND DISTRICT.		
	Re-vote of unexpended balance, repairs, etc., Lock-up	1,100 00	
	Lock-ups at Byng Inlet and French River	1,200 00	
	Township of Hagerman, lock-up at Danchurch	600 00	
			2,900 00
88	NIPISSING DISTRICT.		
	Re-vote of unexpended balance, repairs, etc., Lock-up	4,800 00	
	New lock-up at Sudbury	3,000 00	
	Fencing for grounds, material, with prisoners' labour	500 00	
	New lock-up at Webwood	1,500 00	
			9,800 00
89	RAINY RIVER DISTRICT.		
	Re-vote of unexpended balance, repairs, etc., Lock-up	1,000 00	
	Addition to lock-up, Rat Portage	1,000 00	
	Lock-up, Fort Francis	2,000 00	
			4,000 00
90	MISCELLANEOUS.		
	Re-vote of unexpended balance, repairs Brock's Monument	275 00	
			275 00

XI.—PUBLIC WORKS.

To be voted per Statement (A).....$31,178 00

No. of Vote.	A.	1892.
		$ cts.
91	Public Works.....	31,178 00

No.	SERVICE.	Re-vote.	New Vote.
		$ cts.	$ cts.
91	1. *Maganetewan River Improvement:* To dredge Channel below Burk's Falls.....	2,510 00	3,000 00
	2. *Peninsula Creek Improvement:* To complete stone filling of cribbing, etc..	418 00	
	3. *Balsam River Works:* To construct guide piers and booms above swing-bridge and remove boulders from channel.....	....	1,000 00
	4. *Gull and Burnt River Works:* To remove rock obstruction at Jacob's Ladder, Burnt River.....	.....	500 00
	5. To aid in repairing public landing pier at village of Port Elgin, remainder of the cost to be borne by that municipality and the County of Bruce	750 00	
	6. To meet one-fourth of the cost of proposed bridge and approaches thereto across the Ottawa River at the outlet of Lake Temiscamingue on condition that one-half of such cost is provided for by the Dominion of Canada and the remainder by the Province of Quebec, and that the Province of Ontario shall not in any event be called upon to pay more than the sum now appropriated, and that the plans for and construction of the bridge are approved of by the Commissioner of Public Works.	4,000 00	
	7. Maintenance Locks, Dams and Bridges, including two new swing-bridges at Lindsay and re-construction of Racketty Creek slide..	.....	10,000 00
	8. Surveys, Inspections, Arbitrations and Awards and charges not otherwise provided for.....	.....	5,000 00
	9. Superintendent Locks, Dams and Bridges	.....	1,20000
	10. Lockmasters, Caretakers and Bridgetenders' salaries....	....	2,800 00
	SUMMARY.	7,678 00	23,500 00
	Re-vote included in above.....		7,678 00
	Expenditure on Capital Account (new)		9,500 00
	" for Repairs and Maintenance		14,000 00
	Total Estimate for 1892 .... (Total voted for 1891, $49,540.00.)	....	31,178 00

XII.—COLONIZATION ROADS.

To be voted per Statement..... $95,600.00.

No. of Vote.	A.	To be voted for 1892.	
		$ cts.	
	North Division	16,900 00	
	West Division	15,750 00	
	East Division	35,950 00	
	General Purposes	27,000 00	95,600 00

No. of Vote.	SERVICE.	To be voted for 1892.	
	North Division.	$ cts.	$ cts.
	Bruce Mines and Desert Lake Road—to continue northward	600 00	
	Cockburn Island Roads	500 00	
	Coffin Road and Bridge	500 00	
	Echo River Bridge	1,000 00	
	Goulais River Bridge—balance to complete renewal, the Dominion Government to contribute one-half—estimated cost, $4,200	1,100 00	
	Grand Portage Road—to repair	800 00	
	Great Northern Road—to repair	750 00	
	Honora Bay Road—(Manitoulin Island) to connect with Sucker Creek Road	750 00	
	Kaministiquia Bridge repairs	1,000 00	
	Patton Road—to open eastward on Con. 2 Patton, and northeasterly towards Township of Montgomery	800 00	
	Rabbit Mountain and Whitefish Lake Roads	2,000 00	
	Rat Portage and Keewatin Road	600 00	
	Rainy River District Roads	5,500 00	
	Spanish River Road—through Victoria, Shedden, Salter and Hallam—in sections	1,000 00	16,900 00

XII.—COLONIZATION ROADS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1892. $ cts.	$ cts.
	West Division.		
	Armour Roads—to open 10 and 11 side line from seventh concession $300; and to open from lot 15 to lot 20 in concession 10, $350	$ 650 00	
	Baysville Bridge—to renew	1,500 00	
	Beaver Lake Road—to construct between lots 10 and 11, Spence, from railway northward	1,000 00	
	Bethune, 10 and 11, side line Road, from con. 2 to con. 6	500 00	
	Bracebridge Bridge—to renew	2,000 00	
	Eagle Lake Bridge—to renew	900 00	
	German Road—to construct from near Arnstein, township of Mills	400 00	
	Joly Road—to repair and extend between concessions 4 and 5, Joly	500 00	
	Laurier Road—to open 10 side line from concession 12 northward	500 00	
	Machar, 5 and 6 side line Road—to open to concession 7	500 00	
	Maganetawan Bridge—to build,—the Municipality of Township of Perry to contribute balance to complete	300 00	
	Mills and Wilson Road—to extend westward	750 00	
	Muskoka Road—to complete to Westphalia road, $500, and to repair between Berriedale and Sundridge, $500	1,000 00	
	Muskoka and Bobcaygeon Road—to complete opening to Dorset	800 00	
	New Jerusalem Road (in Machar)—to complete between 20th and 30th side roads	500 00	
	Oakley Bridge—to renew	1,500 00	
	Pringle Road—extension northward in Pringle through concessions 10 to 12 inclusive	500 00	
	Simpson Road—to construct from Mills road, lot 25, concession 12, Mills, to 12th and 13th concessions and thence eastward	750 00	
	South River Bridge—to construct between lots 3 and 4 on road allowance between concessions 12 and 13, Machar	400 00	
	Strong Township Roads—to improve 30 side line $500, and to improve bad hills on lot 17, concession 10, $300	800 00	15,750 00
	East Division.		
	Addington Road—to repair between Addington and Cloyne, $800; and repairs in Denbigh, $500	1,300 00	
	Arden Road—repairs in South Kennebec	500 00	
	Abinger and Miller town line Road—to open boundary from Mississippi Road southward	500 00	
	Belmont Road—conditional that the townships of Belmont and Methuen contribute $50, and the county of Peterborough $100	400 00	

XII.—COLONIZATION ROADS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1892.	
	East Division—Continued.	$ cts.	$ cts.
	Booth Road—to continue construction northward towards Monck Road.	400 00	
	Bobcaygeon Road—repairs through Galway and Somerville	750 00	
	Buckhorn Road—to construct north through Cavendish and Glamorgan	1,200 00	
	Burleigh Road—to repair in Chandos and Burleigh	500 00	
	Bonfield 4 and 5 concession Road—to open to mill from lot 10	500 00	
	Callender and North Bay Road—to continue west towards Nipissing Junction	700 00	
	Cavendish Roads	600 00	
	Clare River Bridge—repairs	800 00	
	Caldwell Road—to continue west	750 00	
	Cameron and Papineau T. L. Road—to open	500 00	
	Eau Claire Bridge and Road in Calvin	1,000 00	
	Galway and Cavendish Roads—to construct eastward to Buckhorn Road.	800 00	
	Grattan and South Algona Road—to complete	400 00	
	Hagarty and Brudenel 16th concession Road	400 00	
	Hagarty 5 and 6 concession Road—to repair and open	750 00	
	Hastings Road—repairs	1,600 00	
	Hyde's Chute and Sanson Road—repairs	600 00	
	Lake Clear and Lyndoch Road—repairs in township of Sebastopol and Lyndoch	500 00	
	Larchwood Road—to continue construction of	1,500 00	
	Mattawa and Callender Road—to improve	800 00	
	Mattawa 11 and 12 concession Road—to open	400 00	
	Methuen Road—to repair	300 00	
	Mountain Grove Road, in Olden	400 00	
	Nosbonsing and South East Bay Road—to improve and extend to Ferris.	600 00	
	North Bay and Widdifield Road—to repair	500 00	
	New Carlow Bridge—over Papineau Creek lot 6, concession 13, Carlow.	450 00	
	Nogey's Creek Road—to construct from lot 25, concession 17, Harvey northward	300 00	
	North Harvey Road—to continue west and build bridge over Mississaga Creek between lots 8 and 9	800 00	
	Nosbonsing Road—to extend	1,000 00	
	Opeongo Road—repairs	1,000 00	

XII.—COLONIZATION ROADS—*Concluded.*

No. of Vote.	SERVICE.	To be voted for 1892.	
	East Division—Concluded.	$ c.	$ c.
	Oak Lake Road—conditional, that the Co. of Peterborough contributes $100, and the townships of Belmont and Methuen $50	200 00	
	Ottawa River Road—to repair in township of Mattawa	400 00	
	Palmer Rapids and Snake Creek Road—repairs and production into Radcliffe and Raglan	750 00	
	Papineau, 12 and 13 concession Road—to repair	500 00	
	Powassan and Callender Road	1,000 00	
	Peterson Branch Road—repairs from Combermere eastward	500 00	
	Rayside Road—to continue	500 00	
	Reid Road, in Galway—conditional that township of Galway gives $50, and county of Peterborough $100	200 00	
	Sturgeon River Road—to continue	1,000 00	
	Sturgeon Falls Road—repairs	500 00	
	Sudbury Road—to continue west	800 00	
	Sudbury and Whitefish Lake Road—to continue	500 00	
	Stone Dam and Desert Lake Road (township of Loughboro')—to improve	800 00	
	Trafford and Tamworth Road, in Sheffield	500 00	
	Trout Lake Road—to extend eastward	600 00	
	Veuve River Bridge and Road, near Verner Station	1,000 00	
	Wahnapitae Road	2,000 00	
	Wisawasa Road—to open from concession 3 Ferris, southward between lots 20 and 21 to lake	700 00	35,950 00
	General Purposes.		
	New short Roads and repairs	20,000 00	
	Inspection	6,000 00	
	To pay balances of 1891	1,000 00	27,000 00

XIII.—CHARGES ON CROWN LANDS.

To be voted per statement (A).....$130,209 00.

No. of Vote.	A.	1891.	1892.
		$ c.	$ c.
92	Expenditure on account of Crown Lands	183,682 00	130,209 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1891.	1892.
92	Details.	$ c.	$ c.
	Board of Surveyors	400 00	400 00
	Agents' salaries and disbursements	28,500 00	28,500 00
	Forest ranging, inspection of timber limits	29,000 00	25,000 00
	Fire ranging.....	18,000 00	22,000 00
	Special timber inspection.....	3,000 00	3,000 00
	Cullers' Act	2,000 00	500 00
	Inspection of agencies.....	.....	150 00
	Fishery overseers	500 00	1,000 00
	Note.—Half the appropriation for fire ranging and the whole of the amount taken for special timber inspection will be refunded by the licensees.		
	Crown Timber Agency, Quebec.		
	Agent's salary..... $1,400 00		
	Messenger and Assistant..... 400 00		
		1,750 00	1,800 00
	Contingencies:		
	Rent $125 00		
	Sundries 125 00		
		250 00	250 00
	Crown Timber Agency, Ottawa.		
	Agent's salary..... $1,400 00		
	Clerk " 1,000 00		
	Clerk " 850 00		
		3,250 00	3,250 00
	Contingencies:		
	Rent $400 00		
	Fuel 100 00		
	Travelling expenses 100 00		
	Postage 100 00		
	Sundries 50 00		
	Caretaking, etc 109 00		
		859 00	859 00

XIII.—CHARGES ON CROWN LANDS—*Continued.*

No. of Vote.	SERVICE.	Salaries and expenses. 1891.	**1892.**
	DETAILS—*Continued.*		
	SURVEYS.	$ cts.	$ cts.
	Townships in new districts	35,000 00	35,000 00
	Maps	2,000 00	2,000 00
	Survey of limits in Huron and Ottawa territory, chargeable against holders	2,500 00	2,500 00
	MISCELLANEOUS.		
	Refund to holders of timber limits or parts thereof, heretofore sold by the Province and taken by the Government of Canada as part of Whitefish Indian Reserve, (estimated). Part re-vote	47,600 00	4,000 00
	Taxed costs payable to Dominion Government	3,473 00	
	Additional expenses re mining commission	500 00	
	Government share of Willow Creek drain, Township of Harwich	300 00	
		178,882 00	130,209 00

XIV.—REFUND ACCOUNT.

To be voted per Statement (A) $23,115 81

No. of Vote.	A.	1891.	**1892.**	Compared with Estimates of 1891. Increase.	Decrease.
		$ c.	$ c.	$ c.	$ c.
93	Education	2,000 00	1,000 00		1,000 00
94	Crown Lands	18,500 00	18,500 00		
95	Municipalities Fund	1,581 58	1,459 92		121 66
96	Land Improvement Fund	2,881 79	2,155 89		725 90
		24,963 37	23,115 81		1,847 46

No. of Vote.	SERVICE.	To be Voted for **1892.**	
93	EDUCATION.	$ c.	$ c.
	To pay withdrawals from Superannuation Fund		1,000 00
94	CROWN LANDS.		
	For payments made to the credit of the Department on account of uncompleted purchases, and afterwards returned to proposed purchasers on purchases not being carried out	7,500 00	
	For two per cent. of timber dues payable to municipalities for timber cut on road allowance	6,000 00	
	Refund to settlers under the amendment to the Free Grants Act of 1880.	5,000 00	
			18,500 00

XIV.—REFUND ACCOUNT—*Continued.*

No. of Vote.	SERVICE.		To be voted for 1892.	
			$ cts.	$ cts.
95	MUNICIPALITIES' FUND.			
	Amount collected in 1891	4,046 05		
	Less 20 per cent. commission	809 21		
	Vide Stat. Can. 18 Vic. c. 2, and 19 Vic. c. 16.	3,236 84		
	To be added to grant to Public and Separate Schools (50 V. chap. 5)	1,776 92		
	To pay Widows Pensions for 1891		1,459 92	
				1,459 92
96	LAND IMPROVEMENT FUND.			
	Moneys collected from sale of Crown Lands, subject to the Land Improvement Fund, for the year ending 31st December, 1891	3,218 48		
	Less 6 per cent. for cost of collection and management	193 10		
		3,025 38		
	1-5 to the Land Improvement Fund	605 07		
	Vide Stat. Can. 16 Vic. c. 157, and Con. Stat. Can. c. 26		605 07	
	Moneys collected from the sale of Common School Lands, subject to the Land Improvement Fund, for the year ending 31st December, 1891	6,083 09		
	Less 6 per cent. for collection and management	364 98		
		5,718 11		
	To be distributed as follows:—			
	‡ to Land Improvement Fund	1,429 50	1,429 50	
	Moneys collected from the sale of Grammar School Lands, subject to the Land Improvement Fund, for the year ending 31st December, 1891	516 25		
	Less 6 per cent. for collection and management	30 97		
		485 28		
	To be distributed as follows:			
	‡ to Land Improvement Fund	121 32	121 32	2,155 89
				$23,115 81

XV.—MISCELLANEOUS.

To be voted per Statement (A) ..... $83,730 00.

No. of Vote.	A.	1891.	1892.
		$ cts.	$ cts.
97	To cover expenses of collection of revenue for law stamps and licenses...	2,000 00	2,000 00
	Industrial School, Mimico	3,500 00	3,500 00
	Marriage licenses	500 00	500 00
	Ontario Rifle Association	1,000 00	1,000 00
	Ontario Artillery Association	500 00	500 00
	Expenses, elections	11,000 00	6,000 00
	Voters' lists	2,000 00	2,700 00
	Gratuities	5,000 00	5,000 00
	Gratuity to Mrs. Notman widow of John Notman, late Queen's Printer	.....	2,500 00
	" D. R. Clark, Taxing Master, Osgoode Hall	.....	2,000 00
	" H. S. Crewe, late Inspector Vital Statistics	.....	2,000 00
	" to widow of Robert McCallum, Engineer	.....	680 00
	Special grant to George Smith, injured in public service	.....	200 00
	In aid of archæological researches in Ontario	1,000 00	1,000 00
	Telephone services	1,300 00	1,300 00
	Removal of patients	6,000 00	7,500 00
	Prisoners' Aid Society	1,000 00	1,000 00
	Sanitary Investigations and Health Conferences	500 00	500 00
	Outbreak of Epidemics	1,500 00	1,500 00
	University College, Ladies' Department	500 00	500 00
	Grant to Vaccine Farm	250 00	250 00
	Factories' Act:—		
	Salaries $3,000 00		
	Expenses 1,500 00		
		4,500 00	4,500 00
	To cover expenses of arbitration with Canada and Quebec	10,000 00	10,000 00
	Drainage Commission (re-vote of $2,000)	2,000 00	3,000 00
	Exhibit for Imperial Institute	1,500 00	1,500 00
	Dominion Teachers' Association	.....	500 00
	Canadian Military Institute, for printing historical papers	.....	100 00
	Columbia Exhibition at Chicago	.....	15,000 00
	Removal, office furniture, library, etc., to new buildings	.....	5,000 00
	Fitting up new library	.....	2,000 00
	Other items voted for 1891, including Supplementaries	24,701 70	.....
		80,251 70	83,730 00

XVI.—UNFORESEEN AND UNPROVIDED.

To be voted per Statement (A) ..... $50,000 00.

No. of Vote.	A.	1891.	1892.
		$ cts.	$ cts.
98	To meet unforeseen and unprovided expenses	50,000 00	50,000 00

SUPPLEMENTARY ESTIMATES

1892.

CIVIL GOVERNMENT.

100	ATTORNEY-GENERAL'S DEPARTMENT:		
	Attorney-General and Premier—increase of salary	$2,000 00	
	CROWN LANDS DEPARTMENT—EXPENSES:		
	Typewriter	80 00	
	To pay for services in making Parliamentary returns	1,000 00	
	PROVINCIAL TREASURER'S DEPARTMENT:		
	Clerk of Algoma taxes	300 00	
	REGISTRAR GENERAL'S DEPARTMENT:		
	To bring up arrears of work	2,500 00	
	INSPECTOR OF PRISONS AND CHARITIES OFFICE:		
	Messenger, youth (omission in Estimates)	25 00	
	QUEEN'S PRINTER'S DEPARTMENT:		
	Messenger (omission in Estimates)	50 00	
	Stocktaking	200 00	
			$6,155 00

LEGISLATION.

101	Fireman and messenger		$500 00

ADMINISTRATION OF JUSTICE.

102	Judge Bell, commutation of Surrogate Fees, remainder of year ($450).	$375 00	
	Neil McLean, as referee in lieu of fees	200 00	
	Housekeeper at Osgoode Hall (omitted in Estimates)	50 00	
	Clerk *pro tem.* in office of Taxing Masters	800 00	
	Detective Greer (heretofore paid out of vote for special services)	750 00	
	Police Magistrate between Fort William and Rat Portage	400 00	
	Travelling expenses	200 00	
	Allowance for clothing, Provincial Detectives	150 00	
			$2,925 00

EDUCATION.

103	DEPARTMENTAL EXAMINATIONS:		
	Secretary, Joint Board of Examiners		$200 00

AGRICULTURE.

104	DAIRYMEN'S ASSOCIATIONS:—East and West,—for Dairy Schools etc		$1,500 00

PUBLIC BUILDINGS.

105	ASYLUM FOR INSANE, LONDON:		
	Repairs to boiler, north house	$200 00	
	Kitchen, addition to engineer's house	275 00	
	Fittings for new slaughter house and cow stable	150 00	
			$625 00

ASYLUM FOR INSANE, HAMILTON:		
Paint shop for storage of oils, turpentine and painters' supplies	$150 00	
Shop for engineer's and blacksmith's work	300 00	
		$450 00
ASYLUM FOR INSANE, KINGSTON:		
New hot water boiler	$125 00	
Tank and cart for carting oil	50 00	
Fittings for slaughter house	150 00	
Purchase of 15 acres between Asylum and New Court Farm	4,000 00	
		$4,325 00
ASYLUM FOR INSANE, MIMICO:		
Wells for water supply at farm, cottages and stables		$400 00
AGRICULTURAL COLLEGE, GUELPH:		
Sewers and sewer connections, Agricultural College, Guelph		$500 00
SCHOOL OF PRACTICAL SCIENCE:		
Department of Metallurgy and Assaying, additional appliances		$1,500 00
REFORMATORY FOR BOYS, PENETANGUISHENE:		
Roof on boiler room, main building	$200 00	
Plumbing and steamfitting, Protestant Chaplain's house	150 00	
General repairs, furnishings, etc.,	450 00	
Reconstruction of building destroyed by fire	3,500 00	
		$4,300 00
CENTRAL PRISON:		
For use of patents for wire beds and attachments		$810 00

PUBLIC WORKS.

106	Finishing wharf at Southampton on River Saugeen; contribution to		800 00
	MISSISSIPPI RIVER IMPROVEMENT:		
	To remove rock obstruction in channel of river in Township of Dalhousie		2,000 00
	NATION RIVER IMPROVEMENT:		
	Revote of amount voted in 1890 (conditional)		3,000 00

COLONIZATION ROADS.

107	COBDEN ROAD:		
	Repairs	750 00	
	DOUGLAS AND CLONTARF ROAD:		
	Repairs in Sebastopol and Grattan	500 00	
	DALTON 25 AND 26 SIDE LINE ROAD:		
	To complete opening from concession 8 to Washago and Black River Road, and build piers at Kehoe's bridge	500 00	
	GILLIES AND O'CONNOR TOWN LINE ROAD:		
	To open portion of and bridge Whitefish River	900 00	
	INDIAN PENINSULA ROADS	1,800 00	
	MATTAWA ROAD:		
	Repairs from Heney's Creek westward in Township of Maria	500 00	
	MISSISSIPPI JUNCTION BRIDGE AND ROAD:		
	To replank and repair bridge, $200; and repair of road between bridge and Ompah, $200	400 00	
	MUD LAKE AND KILLALOE ROAD:		
	To make repairs from Mud Lake to and beyond Killaloe in Hagarty, 25 miles	750 00	
	MUSQUOSH ROAD:		
	To improve westerly end	250 00	
	SOUTH FALLS BRIDGE:		
	To renew superstructure	350 00	

	STAFFORD ROAD:		
	To complete opening through concessions 3 to 5 between lots 6 and 7, Stafford	500 00	
	WEST RIDEAU LAKE BRIDGE:		
	(About lot 19, concession 9, Bedford) to renew	600 00	
	WILBERFORCE AND NORTH ALGONA TOWN LINE ROAD:		
	To open from between concessions 17 and 18 northward to line between concessions 19 and 20	400 00	
	To renew floating bridge in Stephenson on Utterson Road	500 00	
	Roads on Rainy River, Upper section	1,000 00	
	BATCHAWANING ROAD:		
	Repairs	750 00	
			$10,450 00

CHARGES ON CROWN LANDS.

108	Additional for share of fire ranging		$5,000 00

MISCELLANEOUS.

109	Gratuity to E. W. Murphy, Protestant School Teacher Boys' Reformatory, (21 years' service)	$1,050 00	
	Gratuity to J. Patterson, engineer at Orillia (14 years' service)	700 00	
	W. Scott, foreman woodworking shop Central Prison, services discontinued by arrangement	600 00	
	Miss McIntyre, laundress at Agricultural College, disabled by having hand crushed by machinery when on duty	250 00	
	J. H. Hunter, salary as Registrar of Friendly Societies under new Act	600 00	
	Clerk's salary—additional in consequence of increased duties under new Act	100 00	
	Clerk in Insurance Department	600 00	
	Contingencies in Insurance Department, including printing forms, registers, etc., books for office and occasional services of shorthand writer.	1,000 00	
	Fish and Game Wardens	1,200 00	
	Travelling and other expenses in connection with fish and game protection	800 00	
	Proportion costs re Sharpe & Lakefield Lumber Company	750 00	
	To pay bounty, destruction of wolves	500 00	
	Gratuity to Wm. Moore Kelly (additional)	500 00	
	Vaccine farm (re-vote)	125 00	
	Imperial Institute, expenses of collection, shipment, freight, etc.	4,000 00	
	Centenary celebration First Parliament Upper Canada (Contribution) at Niagara	1,000 00	
	Centenary celebration First Parliament of Upper Canada (Contribution) at Toronto	1,000 00	
	Dehorning Commission	2,000 00	
	Towards equipment of School of Mines at Port Arthur, to be paid on the report of the Director of Mines	3,000 00	
	Towards salaries of teaching staff of the School	2,000 00	
	Hudson Bay Co'y, part expenses arrest of Reddan for robbery of furs	154 47	
	Making of roads, laying out and ornamentation of grounds, for Legislative Chamber, library, council chamber, post office, etc.	50,000 00	
	ditto Departments	10,000 00	
			$81,929 47
			$127,369 47
110	To defray expenses of Legislation, Public Institutions Maintenance, and for salaries of the officers of the Government and Civil Service for the month of January, 1893		$80,000 00

REPORT

OF THE

COMMISSIONER OF PUBLIC WORKS

FOR THE

PROVINCE OF ONTARIO

FOR THE

YEAR ENDING 31ST DECEMBER,

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
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1892.

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REPORT

OF THE

COMMISSIONER OF PUBLIC WORKS

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR ENDING 31ST DECEMBER, 1891.

To His Honour SIR ALEXANDER CAMPBELL, K. C. M. G.,
Lieutenant-Governor of the Province of Ontario, etc.

As required by the provisions of the Statute in that behalf, I beg to submit the report of the works, etc., prosecuted under the control of the Public Works Department, during the year 1891.

Details of matters in connection with the Public Institutions and Buildings will be found in the report of the Architect, etc.

The report of the Engineer contains details of the year's operations in respect of locks, dams, slides, etc. The progress of railway construction throughout the Province during the year, will also be found in this latter report.

The usual statements of the Accountant and Law Clerk, as to the expenditure in respect of the several appropriations, are appended hereto.

Very respectfully submitted,

C. F. FRASER,
Commissioner.

DEPARTMENT OF PUBLIC WORKS, ONTARIO,
December 31st, 1891.

REPORT

OF

THE ARCHITECT, ETC.

DEPARTMENT OF PUBLIC WORKS, ONTARIO,
TORONTO, December 31st, 1891.

SIR,—I have the honour to submit the following report:—

GOVERNMENT HOUSE.

The ordinary repairs to the residence and outbuildings were made as required, and the grounds have been kept in good order. Some furniture and furnishings were supplied. A small cottage was erected for the gardener, on the west side of the grounds, fronting on King Street, the contractors being Messrs. Garson & Purcer, whose tender, after due advertisement, being the lowest was accepted. The work was under the immediate superintendence of the Department. The green-house attached to the conservatory being in want of repair, was taken down and re-constructed on the old foundations. The work was done by the carpenter of the Department, and the bricklayer usually employed.

NEW PROVINCIAL PARLIAMENT BUILDINGS.

Considerable progress was made in the construction of these buildings during the year. The roofs were completed and the buildings protected from the weather, with the exception of the slating in the central portion, the slates for which are now on the ground and the work in progress. The plastering of the east and west wings and the intermediate portions is now nearly completed. The works connected with the steam heating, ventilation and plumbing, and the interior wood finishing are well advanced, and progress has been made in the construction of the outer drainage. The cut-stone work, masonry and brickwork is completed with the exception of the main entrance, and "porte cocheres," which will be completed early next year.

OLD PARLIAMENT AND DEPARTMENTAL BUILDINGS.

The usual ordinary repairs were made and the grounds have been kept in good order. Sundry articles of furniture and furnishings were supplied as required.

ASYLUM FOR THE INSANE, TORONTO.

There has been no expenditure for this institution during the year.

COTTAGES AT MIMICO.

The sixth, seventh and eighth cottages were occupied during the early part of the year, and the arc lights for the outside lighting of the grounds were completed. The houses for the farmer and engineer were also occupied, and the piggery and driving house completed in the early part of the year. Two cottages for refractory patients, with the connecting subways, plumbing, drainage, etc., are now nearly completed, the tender of the contractors, Messrs. Garson & Purcer, St. Catharines, after due advertisement, being the lowest was accepted. Messrs. Purdy, Mansel & Mashinter's tender for the steam heating, after due advertisement, being the lowest was also accepted. One of the cottages will be ready for occupation on the 1st of February, and the second on the 1st of March next, affording accommodation for 110 additional patients. Double sashes for the windows of the cottages facing north were provided, and platform scales constructed, for the amounts stated in the estimates. Some grading was also done to form terraces round the several cottages. This work was superintended by R. Chisholm, Clerk of Works. Tenders were received for the construction of the sewage disposal works and the fence round the cemetery lots, for which plans and specifications were prepared, the lowest, after due advertisement, being that of A. J. Brown, Toronto, which was accepted. The sewage disposal works are now nearly completed, and will soon be tested, the ferozone to be used in the precipitating tanks having arrived from England. When completed and tested, a full account of the method adopted for deodorizing the sewage, etc., will be given in detail. The fence around the cemetery lots has been completed, with some necessary grading, and the cemetery has been transferred to the Inspector of Asylums. Plans and specifications were prepared for a house for working patients on the farm, and for an entrance lodge to the Asylum Cottages, and, after due advertisement, the tender of William Clarke, Toronto, being the lowest, was accepted. These buildings are now nearly completed and will soon be occupied. Tenders were also received for heating the cottage for working patients with hot air, and the tender of E. & C. Gurney, being the lowest, was accepted Plans and specifications were also prepared for the construction of an entrance road to the asylum cottages, and tenders received, but the work has been postponed for the purpose of ascertaining whether the labour of the patients could not be utilized in constructing the road. Owing to the low level of the water in Lake Ontario, which was four inches lower than in November, 1872, the lowest recorded since 1854, the water supply at the pumping engine house at the lake shore was affected, owing to the suction pipe being exposed, air having been drawn through the flexible joints. The joints were caulked with lead, and new rubber valves have been placed in the pumps, the water supply being now quite satisfactory. Though the supply was affected, the institution was not deprived of its water supply.

ASYLUM FOR INSANE, LONDON.

The works in connection with the central boiler house, coal vault, and six new steel boilers have been fully completed, and are quite satisfactory to the Asylum management. The reconstruction of the steam heating of the main building was done under the superintendence of the Asylum engineer, and was

completed early in the autumn. These improvements are expected to reduce the consumption of fuel and consequently the cost of maintenance. The duplicate pump was completed early in the season, and so far as tested by the engineer, the duty is about one-third greater than the old pump, the steam pressure being equal in both instances. The piggery was also completed early in the season, and the old piggery has been abandoned. Tenders were received after due advertisement for the construction of a slaughter-house, etc., on the farm west of the Asylum grounds, near the piggery, a coal shed for the west cottage, and for the repairs to the eavetroughs, down pipes, painting, etc., the lowest, after due advertisement, being that of John Purdom, which was accepted, and the work in connection with the same was completed in a satisfactory manner. Plans and specifications were prepared and tenders received for the re-arrangement of the central hall and apartments in the main building, and the tender therefor of John Purdom, being the lowest, was accepted. This latter work is now in progress and will soon be completed, without much interference with the management. The construction of the additional tanks for the water supply, being in connection with the proposed annexes for the dining rooms of the wings, was postponed until the question of this improvement has been decided. A re-vote of the appropriation will be required. Plans and specifications were also prepared for some alterations at the main entrance and fire-escape on the front of the main building, the work having been done by the Asylum authorities and charged to maintenance. The works for the year were done under the superintendence of C. Bodley, Clerk of Works.

ASYLUM FOR INSANE, HAMILTON.

The slaughter house and piggery on the farm and the coal vaults in the rear of the main building were completed during the season. The drains and water supply in connection with the slaughter house and piggery were also constructed. Some repairs were required to the pumping engine at Queen street, and connections were made with the main supply water pipes so as to afford a more direct flow with less bends, which have been found efficient. The water tanks at the engine house were also cleaned. Tenders were received after due advertisement for the construction of a new barn and root house; the tender of F. W. Schwendimann, being the lowest, was accepted. The root house has been completed, but the barn is not yet ready for occupation. Tenders also were received for increased water tankage and hose tower, also a cottage and fencing at the pumping engine house, and the tender therefor of Messrs. J. & E. Dickenson, Hamilton, after due advertisement, being the lowest, was accepted, and the work will soon be completed. The tank will hold over 200,000 gallons of water, about two days' supply, and will be in connection with the present water tanks in rear of main building which hold about 100,000 gallons. With a stationary pumping engine, and connections with the fire protection pipes and hydrants, the buildings will be well protected from accidents by fire, and the arrangements similar to those at the London Asylum. The construction of the annexes for the dining rooms to the wings was postponed until the proposed connecting passages to the kitchen, for which an additional appropriation would be required, could be further considered. The construction also of the isolated hospital or infirmary for 30 patients was also postponed on consultation with the Inspector of Asylums and the Medical Superintendent. Re-votes of these two items will be required in next year's estimates. The necessary repairs were also made to the eavetroughs and down

pipes. The work was done under the superintendence of H. G. McMahon, Clerk of Works.

ASYLUM FOR INSANE, KINGSTON.

Plans and specifications were prepared for a slaughter house, cow stable and piggery to be erected on the Newcourt farm, in the northern portion of the asylum grounds, and tenders were received after due advertisement. The tender of John Macleod, Kingston, being the lowest, was accepted. The work has been in progress since August last under a Clerk of Works, but is not yet completed. Borings for water were made under the directions of the Inspector of Asylums, and after boring 171 feet a vein of natural gas was struck which yields, as estimated, 6,000 feet an hour. The water which was also struck was of a mineral quality, quite unsuitable for domestic purposes. The natural gas may be utilized for fuel purposes or light as at the Asylum Cottages, Mimico, but it will be necessary to extend the water supply pipes from the asylum to these farm buildings, for which an appropriation will be required. The engineer's and chief attendant's houses were repaired, and an addition to the pumping engine house built by asylum patients, the lumber and other materials which could not be procured on the premises, having been paid for by the Department. The work has been well done. Owing to the low level of the water in Lake Ontario, the lowest on record at this period of the year, as explained in the report on the Asylum Cottages, Mimico, the suction pipes drew air at the flexible joints which were exposed. Messrs. McKelvey & Birch were directed to caulk the joints to prevent further leakage. In connection with the water supply it was found necessary to procure a duplicate pump of the same capacity as the large duplex pump, and arrangements have also been made to transfer the small Northey pump to the Deaf and Dumb Institute, Belleville, for the water supply there.

ASYLUM FOR IDIOTS, ORILLIA.

The main front building was completed and handed over to the Medical Superintendent early in April and was occupied during that month. Alterations were made in the basement by fitting up class and work rooms, as recommended by the Inspector of Asylums and the Medical Superintendent, by which the accommodation has been increased. Tenders were received after due advertisement for the construction of two cottages and a house for employees. The tender of Mr. J. R. Eaton, Orillia, being the lowest, was accepted. The work is now completed. Tenders also were received for a terrace in front of the main building and fencing on the front road, and the tender of Messrs. Garson & Purcer being the lowest was accepted. The work was done in a satisfactory manner under the superintendence of J. Patton, Clerk of Works. Platform weigh scales were constructed near the coal sheds and pumping engine house by Wilson & Sons, Toronto, the foundation having been built by Mr. Eaton, contractor for the cottages. The lines defining the boundaries of the land purchased from Mr. Thompson, 27 acres, were run by Mr. Fairbairn, P. L. S. of the Department, and the fences have been constructed establishing the same. Plans and specifications for a green house were also prepared, and the work was done by the asylum authorities, the cost to be defrayed out of maintenance.

REFORMATORY FOR BOYS, PENETANGUISHENE.

Tenders were received, after due advertisement, for the construction and fitting up of three new steel boilers for the engine room and laundry, the old

boilers having been condemned, and the tender of J. Abell, Toronto, being the lowest, was accepted. The work was done in a satisfactory manner under the superintendence of B. O'Byrne, Permanent Clerk of Works, and the boilers are now in use. Platform weigh scales were constructed near the farm buildings by Wilson & Sons, Toronto, and are now constantly used.

REFORMATORY FOR FEMALES, TORONTO.

Specifications were prepared for the construction of a new steel tubular boiler, for high pressure steam for cooking purposes, the boiler formerly used having been found of too small a capacity for the increased work of the laundry. The old boiler has been utilized as a hot-water boiler, with trifling alterations Tenders were received after due advertisement, the lowest being that of Mr. John Perkins, Toronto. The work has been satisfactorily done under the superintendence of the Department. Plans and specifications were prepared for the alterations in the laundry, and the work was done by the carpenters of the reformatory, the cost, with the exception of the steam pipe fittings to tubs, etc., and other materials were charged to maintenance. The brick work was done by workmen employed by the department. Plans and specifications were also prepared for the erection of a green house, south of the reformatory. This latter work was done by the carpenters of the reformatory, with the exception of fittings for the hot water apparatus, which was done by the Department, the cost of the fittings being charged to maintenance.

CENTRAL PRISON, TORONTO.

There has been no expenditure on capital account at this Institution.

INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.

The Bursar's house was re-shingled, and the drain was constructed from the boiler house, the work having been done by Messrs. Hanley and Dolan. Tenders were received for the construction of an addition to the bakery and a new ice house, also for sewage disposal works, after due advertisement, and the tenders of Messrs. Garson and Purcer, being the lowest were accepted. The work connected with the bakery and ice house have been completed, and the buildings handed over to the superintendent. The sewage disposal works are not yet completed. Nothing has been done with respect to the re-arrangement of the steam heating. Owing to the low level of the water in Lake Ontario, as before mentioned, some inconvenience was caused to the water supply, which has been remedied, and the works are now in a satisfactory condition.

INSTITUTION FOR THE BLIND, BRANTFORD.

Plans and specifications were prepared for the erection of a gymnasium in the rear of the boys' wing and connected with the main building, tenders for which were received after due advertisement, and the tender of Messrs. Garson and Purcer being the lowest was accepted. The work was done under the superintendence of H. G. McMahon, Clerk of Works, at the Hamilton Asylum, who made visits to the work as required. Tenders were also received for an addition to the entrance lodge, the tender of Mr. T. Large being the lowest was accepted, and the work was done in a satisfactory manner, and charged to the

revote of the unexpended balance. There has been no expenditure on account of the appropriation for the sewage disposal. The works connected with the drainage of the City of Brantford are not sufficiently advanced to carry out the agreement entered into with that corporation this year, for providing for the sewage disposal of the institute in perpetuity. A re-vote of the appropriation will therefore be required.

AGRICULTURAL COLLEGE, GUELPH.

Plans and specifications were prepared and tenders received, after due advertisement, for the erection of a convocation hall and gymnasium, and for a laboratory with green-houses, and the tender of Mr. John Damp, Toronto, being the lowest was accepted. The work has been done under the superintendence of John Brown, Brantford, Clerk of Works. Considerable progress has been made, and the buildings will soon be roofed in and enclosed for the winter. The waggon and wood sheds were completed by the contractor Mr. Mahoney. Tenders were received for sundry repairs to the floors, etc., in the college building, and the tender of Bruce & Sons, being the lowest was accepted. This work and other repairs have been done in a satisfactory manner. A re-vote of the unexpended balance will be required to complete the works.

EDUCATION DEPARTMENT, NORMAL AND MODEL SCHOOLS, TORONTO.

Plans and specifications were prepared for the proposed alteration in the theatre of the main building, and tenders, after due advertisement, were received. The tender of W. Clarke, Toronto, being the lowest, was accepted. The work was done in a satisfactory manner, under the superintendence of W. J. Smith, Clerk of Works. Some alterations were made in the steam heating of the Education Department, and Model Schools, under the direction of the department by the plumber. Some furniture and furnishings were provided as required.

NORMAL SCHOOL, OTTAWA.

Tenders were received for the construction of water closets in the front building during the vacation. The tender of the Sanitary Plumbing Co. was accepted for the plumbing, and that of Mr. J. White for the necessary carpenter work and drains. The work was completed in good time before the close of the vacation, and was done in a satisfactory manner. Tenders were also received, after due advertisement, for the erection of an addition for assembly and class rooms, according to plans and specifications prepared in the Department, and the tender of J J. Lyon, Ottawa, being the lowest, was accepted. The basement and first storey of the addition have been constructed under the superintendence of A. R. Macdonald, Clerk of Works, the walls having been covered up and protected from the frost during the ensuing winter. The cut stone work of the second storey and gables will be proceeded with during the winter, and it is expected that the whole work will be completed next year. Some repairs were made to the roofs, and steam heating, furnaces, etc., which are annually required. A re-vote of the unexpended balance will be required to complete the work. To provide for the steam heating of the addition it will be necessary to provide an additional steam boiler and the enlargement of the present boiler-house, for which provision will have to be made in next year's estimates.

SCHOOL OF PRACTICAL SCIENCE, TORONTO.

The principal work done at this building has been the "general equipment of the Engineering Laboratory," which has been under the control of Professor of Engineering, and the supply of apparatus has not yet been completed. A re-vote of the unexpended balance will be required. Owing to the removal of the Department of Mineralogy sundry repairs and alterations were required in the rooms occupied for that purpose, in order to fit them for the Department in Chemistry, etc. Some furniture and furnishings were also required.

OSGOODE HALL, TORONTO.

The brickwork, cut stone and woodwork of the west wing were painted on the outside to correspond with the centre portion and the east wing, the latter having been painted last year by the Law Society. The roof of the west wing was repaired as required. Some repairs were also required for the eavetroughs and down pipes, which are now in good order. At the request of the Law Society a gateway was broken out in the wall near the boiler house, and a gate constructed in lieu of the gateway on the east side of the grounds which has been closed. Furniture and furnishings were supplied as required.

ALGOMA DISTRICT.

In accordance with the recommendation of the Inspector of Prisons, which was approved, iron bedsteads and furnishings were provided for the gaol at Sault Ste. Marie. Some repairs also were done, as required at the several lock-ups in this district.

THUNDER BAY DISTRICT.

Some repairs and furniture were required at the Court House and Gaol at Port Arthur, and at the Lock-up, Fort William, as recommended by the Inspector of Prisons, and approved. A re-vote of the unexpended balance will be required for next year.

MUSKOKA DISTRICT.

Some repairs and furniture were required for the lock-ups at Bracebridge and Huntsville. In accordance with the recommendation of the Inspector of Prisons, a hot air furnace, which had been taken out of the School of Practical Science, was placed in the lock-up at Huntsville, under the superintendence of W. C. Mackenzie, Clerk of Works.

PARRY SOUND DISTRICT.

The furnishing of the Court Room at Parry Sound was completed, and sundry articles of furniture were supplied as required. Some repairs were made to the Lock-up, Parry Sound. A hot air furnace, one of three that had been removed from the School of Practical Science, being no longer required, as the building is heated by steam, was placed in the Lock-up at Burk's Falls, as recommended by the Inspector of Prisons. Tenders were received for fitting up the hot air furnaces in the Lock-up at Burk's Falls and Huntsville, the lowest being that of Mr. M. C. Drew, which was accepted. The work has been superintended by W. C. Mackenzie, Clerk of Works.

NIPISSING DISTRICT.

Sundry repairs and furniture were required at the Lock-up, Sudbury, as recommended by the Inspector of Prisons, and approved. A hot air furnace, which was also removed from the School of Practical Science, was placed in the basement of the Court Room and Lock-up at North Bay, as recommended by the Inspector of Prisons. Tenders were received for the necessary work, registers, etc., required, and the tender of Graham & Co., North Bay, being the lowest, was accepted. The work, which has been done in a satisfactory manner, was superintended by W. C. McKenzie, Clerk of Works, who was appointed for that purpose. A re-vote of the unexpended balance will be sufficient for repairs and furniture next year.

RAINY RIVER DISTRICT.

Sundry repairs and furniture were required for the Court Room and Lock-up at Rat Portage, as recommended by the Inspector of Prisons. Tenders were received, after due advertisement, for the erection of a registry office at Rat Portage, and the tender of J. Craig, Barrie, after due advertisement, being the lowest, was accepted. The work has been done in a satisfactory manner, as reported by Sheriff Carpenter, and the building has been handed over to the Registrar. The building was erected in the rear of the Court Room, on the lot reserved for the purpose.

MISCELLANEOUS.

Some repairs were required to the cut stone work and plastering at Brock's monument, and the shelter was painted, the work having been done in accordance with a tender submitted by the Caretaker, Mr. R. Goring. Some repairs also were required at the Entrance Lodge, which were also done by the Caretaker. The grounds and fences are in good order.

I have the honour to remain,
Your obedient servant,

KIVAS TULLY,

Architect, etc.

Hon. C. F. Fraser,
Commissioner of Public Works,
Ontario.

REPORT

OF

ENGINEER OF PUBLIC WORKS.

DEPARTMENT PUBLIC WORKS, ONTARIO,
TORONTO, 31st December, 1891.

HON. C. F. FRASER, *Commissioner of Public Works, Ontario* :—

SIR,—I have the honor to submit the following report on the construction and maintenance of Public Works, also respecting the extension of railways throughout the Province during the year 1891.

MAGANETEWAN RIVER IMPROVEMENT.

An appropriation of $6500 was granted last session for service on the improvement of this river below the village of Burk's Falls, where, owing to insufficient depth of water, navigation has in the past been seriously interfered with during the latter part of each season.

The works which have been attended to are as follows :—

The construction of a dredge and two scows was commenced in the latter part of May and continued until completion in the early part of September, the dredge being 50 feet in length, 20 feet in width and 4 feet 6 inches in depth, and the scows 41 feet in length, 12 feet in width and a similar depth to the dredge.

The necessary machinery was transferred from the scow on Peninsula Creek, the work of this description in that locality having been completed.

Dredging was commenced on the 7th of September, at a point about 2,920 feet below the steamboat wharf at Burk's Falls, and continued up-stream until the 4th of December, when, owing to the severity of the weather, operations for the present year were brought to a close.

The river has been improved for a length of about 2,000 feet, a channel 40 feet in width and having a depth of water equal to that upon the lift-wall of the lock at Maganetewan, having been excavated through a series of shoals which formed obstructions at different points in the above mentioned distance.

The material removed consisted of clay, gravel and boulders, many of the latter being of such a size as to necessitate blasting in order to enable them to be removed.

A re-vote of the unexpended balance of this appropriation will require to be taken in order to enable this work to be continued during the coming year.

PENINSULA CREEK IMPROVEMENT.

Owing to the nature of the soil, together with the action of the frost and the wash from the steamers, the banks of this channel have, since the completion of the dredging in 1889, kept falling into it in places, until the depth became insufficient to meet the requirements of navigation, and in order to enable a sufficient depth of water to be again provided and to make such improvements as would materially lessen if not entirely prevent a continuance of this damage and inconvenience, an appropriation of $6,500 was included in the estimates for the present year.

The work attended to has therefore consisted entirely of dredging and the construction of cribwork retaining walls at a number of points along the banks where the most serious damage had occurred, and which was at the up-stream or Peninsula Lake end of the channel.

Operations were commenced in the early part of July and dredging continued until about the middle of August, when the channel had been deepened for a length of about 1,700 feet down stream from Peninsula Lake, and the original depth of six feet at low water provided. Considerable material had also to be removed in order to provide a foundation for the cribbing and enable it to be constructed without encroaching on the channel, and the banks have been given considerable additional slope.

The construction of the cribwork was steadily proceeded with during the time the dredging was being attended to, and was also continued until the latter part of December, when, the improvement being completed, operations were brought to a close.

The cribwork has been constructed at six different points, in lengths varying from 227 to 385 feet, the total length being 1,789 feet. The average height of the cribbing is nine feet, the portion below the surface of the water being six and the remainder twelve feet in width. The cribwork is filled to a depth of from four to five feet with stone, the remainder of the filling being sand, which was obtained from the banks when giving them additional slope.

A pier has also been constructed in Peninsula Lake to indicate the exact position of the channel and facilitate the entrance to it on dark or stormy nights.

The pier, 12 feet square and 9 feet in height, is compactly filled with stone and has a conical shaped framework erected upon it, about 12 feet in height, the framework being sheeted in with one inch dressed lumber, painted white, which enables it to be seen for a considerable distance.

MARY'S AND FAIRY LAKES WORKS.

As stated in the report for 1890, the re-construction of this lock was commenced in the month of October and continued until the latter part of December of that year.

Operations were resumed in the early part of February of the present year and continued until the work was completed, the lock being opened for traffic about the 13th of May.

The guide pier, on the westerly side of the canal below the lock, has been extended a length of 250 feet, the width of the cribbing being 10 feet at the base, and the average height about 7 feet, and the old pier has been repaired with a new course of timber, and increased one foot in height. The total length of the cribwork is now 500 feet, and it extends from the lower end of the lock-wall to an island, and entirely closes up an opening through which quantities of gravel found its way into the steamboat channel, and there formed an obstruction which interfered with navigation and had frequently to be removed by dredging.

The channel on the westerly side of the guide pier has been dredged for a length of 650 feet to a width of 25 feet, and to a depth of about 5 feet, the material removed being gravel, which was utilized for filling in and around the outside of the cribwork.

A channel has also been dredged through a sand bar situated at the mouth of the river, in Mary's Lake, which, during seasons of low water, interfered with navigation. The excavated channel is about 300 feet in length, and 50 feet in width, the dredging being continued to a depth of about 2 feet below the lower mitre-sill of the lock.

The river in the Village of Huntsville has also been improved by the removal of a number of boulders from the channel below the swing-bridge, and above the bridge a channel has been excavated through two shoals, having a total length of about 350 feet. The material removed consisted of gravel and boulders ; the width of excavation being about 50 feet and the average depth about 2 feet.

The westerly opening in the dam at the outlet of Fairy Lake has been supplied with two new stop-log posts and a new sill, and the stop-log platform has been replanked and repairs made to the windlasses and frames.

The highway bridge across the river above the lock has been painted, and the trestle approaches to the bridge provided with seven new bents, the old ones having become decayed and in an unsafe condition. Repairs have also been made to the planking of the approaches.

The swing bridge across the canal above the lock has been provided with some new floor stringers, the floor planking renewed and the bridge repainted.

GULL AND BURNT RIVER WORKS.

A dam and slide has been constructed at the outlet of White Lake, on Lot No. 2 in the 1st Concession of the Township of Glamorgan, County of Haliburton.

The main dam is 299 feet in length, 12 feet in width, and an average height of 7 feet, with a wing at the easterly end 41 feet in length and 5 feet in height, the whole being constructed with 12 x 12 inch square timber, well scribed and fitted to the rock and securely rock-bolted.

The cribwork forming the main dam is compactly filled with stone, and the wing dam has been well gravelled in front to make it watertight.

The only openings in the dam are the slide and a portion 23 feet in length and one foot in depth, which has been planked over to form an outlet for the water in time of freshet.

The total length of the slide is 244 feet, the sides for a length of 30 feet from the dam being built of 12 x 12 inch square timber, and the remaining portion 214 feet in length with bents placed at 4 feet centres, and constructed with 8 x 10 inch sills and 5 x 6 inch posts and braces. The bents are framed with a batter of 8 inches to the foot on the sides, and sheeted with 3 inch pine planking, and the bottom, 2 feet 4 inches in width in the clear, is covered with birch planking 4 inches in thickness.

SCUGOG RIVER IMPROVEMENT.

This work was resumed on the 31st of March of the present year and continued until the 25th of June, when the river had been improved from the lower steamboat wharf to the lock in the town of Lindsay, a distance of 2,200 feet, the width of channel provided being about 60 feet and the minimum depth about 6 feet at low water. The work attended to during the present year was of a similar character to that previously reported upon, the excavation consisting entirely of rock, which had to be drilled and blasted, then removed from the bed of the river by a steam dredge and deposited on scows, upon which it was conveyed to different points along the banks and disposed of.

MISSISSIQUA LAKE DAM.

The apron of this dam has been extended 8 feet in width for a length of 66 feet, the cribwork 5 feet 6 inches in height being filled with stone and covered on top, opposite the openings in the dam, with pine planking 6 inches in thickness.

Hardwood glance pieces have also been put on the slide opening to protect the stop-log posts, and some gravelling has been done at the westerly wing and at the easterly end of the main dam.

The work was commenced in the latter part of October and completed on the 21st of November.

LANDING PIER AT SOUTHAMPTON.

The work aided by this appropriation consisted of piling along the face of the public landing pier in this village.

The piles are of cedar, sawn 10 inches in thickness with a 12 x 12 inch square pile driven about every 10 feet and securely bolted to anchor piles with $1\frac{1}{2}$ inch wrought iron bolts. The piling is provided with two rows of 8 x 12 inch square waling, one at the top and the other about 5 feet below, the waling pieces being well bolted to the piles with $\frac{3}{4}$ inch bolts.

The work was required owing to the old dock having become undermined by the water to such an extent that the filling of the cribwork of which it was formed was being continually carried into the river, and the cribwork itself would soon have followed had some protection not been provided. In consequence of this, a considerable quantity of stone and gravel filling had also to be done, in order to bring the surface level and up to the required height.

The work was carried out under contract by the municipal authorities, and upon its completion the Department was notified and examination was made, and it being found satisfactory and properly attested vouchers furnished of the expenditure made in respect of the work, the appropriation of $1,000 was paid.

MUSKOKA LAKES WORKS.

The channel known as "Clark's Cut," which extends from the Indian River to Lake Rosseau, has been improved by putting an additional course of timber on top of the cribwork on each side for a length of 185 feet. The cribwork has also been sheeted in with two inch plank for a similar distance, and some leveling has been done to the adjoining banks.

This work was required in order to prevent the clay, of which the banks are formed, from finding its way into the channel and gradually filling it up, the original cribwork protection constructed of round logs being insufficient to satisfactorily serve that purpose.

MAINTENANCE, LOCKS, DAMS AND SWING BRIDGES.

The repairs and improvements attended to out of this appropriation, in addition to these already referred to in connection with other works, are as follows:—

Bala Dams.

In order to stop serious leakage of the dams at this point, repairs of a somewhat extensive character have had to be made during the present year.

A coffer-dam about 120 feet in length was put in above the southerly dam and an embankement, constructed principally of stone, and through which considerable water found its way, was removed and replaced with timber, and well gravelled. All the piers in the dam have also been sheeted with 2 inch jointed plank, two of the openings provided with aprons, and some timber work put in at the northerly end where the leakage had been considerable.

The dam has also been supplied with two new windlasses and frames, repairs made to the old stop-logs, and two new ones provided.

The stop-log sill in one of the openings of the northerly dam having been displaced by timber, has been re-fixed, and one new stop-log and three new windlasses and frames have also been provided.

The flooring on the southerly approach of the roadway bridge has also been renewed with 3 inch pine planking.

The repairs were attended to during the season of low water, being commenced about the middle of October and continued until about the 27th of November.

Port Carling Lock, etc.

This lock has been provided with a full set of new framed gates, to replace the old solid timber ones which were in a worn out condition.

The guide pier at the lower entrance on the northerly side, has been replanked for a length of 14 feet, and the top course of timber on the pier on the southerly side, has been renewed for a length of 40 feet, and the top of the pier re-planked with 2 inch pine planking.

The planking on the northerly side of the lock chamber has also been renewed for a length of 60 feet, and above the lock has been generally repaired, new planking being put in where required, and the lock chamber and guide piers have been provided with a $2\frac{1}{2}$ x 8 inch oak ribbon to protect the side planking from injury by the steamers. The swing bridge has been provided with a new frame and racking for the swinging gear, and both the swing and fixed bridges have been painted.

Port Sandfield Swing Bridge, etc.

The turntable of this bridge has been provided with two new wheels and a new shaft, and some other ordinary repairs attended to, and the bridge and approaches have been painted.

A new storehouse has also been constructed, 24 feet in length and 14 feet in width, to replace the old one, which was in a decayed and dilapidated condition.

Maganetewan Lock, etc.

Repairs have been made to this lock by putting in a quantity of concrete around the bottom of the chamber, and in the lower mitre-sill platform, to stop leakage which seriously interfered with the proper working of the gates, and some of the planking on the mitre-sill platform has been renewed.

The sheeting in the lock-chamber has also been re-fastened with 7 inch wrought iron spikes, and repairs have been made to the diagonal straps on the gates.

Ah-Mic Lake Dam.

A glance boom about 500 feet in length has been provided and placed in the river above this dam. The boom is three feet in width, constructed of 10 x 12 inch square pine timber, strongly bolted and keyed together.

The dam has been provided with some 12 x 12 inch square timber braces, and the top course of the pier at the westerly end, which was displaced by the ice during the freshet last spring, has been re-fixed in its proper position.

Dam at Norland.

This dam has been gravelled to make it watertight.

Bob Lake Dam and Racketty Creek Slide.

The dam at the outlet of Bob Lake has been supplied with one new stop-log, and the Racketty Creek Slide, which is situated a short distance below, has been provided with several new posts and braces, and repairs have been made to the planking.

Workman's Dam and Slide—Gull River.

This dam has been supplied with one new windlass and frame, and repairs have been made to the stop-logs and also to the flooring of the slide.

Horse Shoe Lake Dam.

The dam at the outlet of this lake has been provided with four new windlasses and frames, and the stop-log platform has been re-planked with 2 inch planking for a length of 30 feet. Repairs have also been made to the stop-logs.

Redstone Lake Dam.

The dam at the outlet has been supplied with three new stop-logs, and the pile dam at the southerly end of the lake has been gravelled to make it watertight.

Kenesis Lake Dam.

The cribwork foundation of the apron to this dam has been filled with stone, and the flooring of the slide opening and apron has been renewed with six inch planking. The dam has also been supplied with one new stop-log.

Devil's Creek—Dam and Slide.

A pier has been built to support the lower end of this slide 10 feet in length, 6 feet in width and 4 feet in height, and the slide has been replanked with hardwood for a length of 16 feet, and some gravelling done to the dam.

High Falls Dam and Slide—Burnt River.

This dam has been provided with three new stop-logs, and the pier at the head of the slide has been raised one foot in height. A pier 10 feet in length, 6 feet in width and 4 feet in height has also been constructed at the lower end, and the sides of the slide have been rebuilt with 12 x 12 inch square timber for a length of 50 feet. Three new cross-sills of 12 x 12 inch square timber 14 feet in length, one new stringer 40 feet in length, and four new posts have also been provided, and the flooring for a length of 20 feet has also been renewed with hardwood planking four inches in thickness.

Young's Point Lock and Swing Bridge, etc.

The swing bridge at this lock has been entirely reconstructed. The bridge is 66 feet in length and 13 feet 8 inches in width, constructed on the "Howe Truss," principle with dressed material and well painted.

During the construction of the new bridge a scow belonging to the Department was placed in the canal above the lock and utilized as a temporary crossing, so that neither public travel or navigation was in any way interfered with.

The guide pier on the westerly side below the lock has been lowered two and a half feet for a length of 22 feet, so as to make it more convenient for steamers during the seasons of low water, and some bolts have been put in the valves and some stones which interfered with the working of the lock have been removed from the chamber, the Departmental diving apparatus being utilized for the purpose.

Lindsay Lock and Swing Bridges.

This lock has been provided with an entire new set of gates, the construction of which was commenced in the early part of January of the present year. The work was completed and the gates placed in position without navigation being in any way interfered with. The three swing bridges have been attended to and received the usual ordinary repairs.

The following are the lockmaster's returns of the lockages made at the different locks during the year:—

Port Carling Lock—1,607 steamers, 1,376 small boats, 592 scows and 411 cribs of timber.

Young's Point Lock—898 steamers, 38 small boats, 160 scows and 83 cribs of timber.

Maganetewan Lock—683 steamers, 57 small boats, 33 scows and 22 cribs of timber.

Lindsay Lock—142 steamers, 156 scows and 192 cribs of timber.

Mary's and Fairy Lakes Lock—79 steamers and 58 scows.

Balsam River Lock—30 steamers, 60 small boats, 15 scows and 45,000 saw-logs.

EXTENSION OF RAILWAYS IN 1891.

Construction work has been in progress on several new lines of railway during the present year, the following being as far as could be ascertained the details of the work done.

Waterloo Junction Railway.

As previously reported, the construction of this line, which extends northward from the town of Waterloo to the village of Elmira, a distance of about 10¼ miles, was commenced in the month of December, 1890. Operations were continued during the present year, the line being completed and opened for traffic, as a portion of the Grand Trunk system, on the 7th of December.

Toronto Belt Line Railway.

The construction of this railway has been steadily proceeded with during the present year and the entire line is now practically completed, but has not yet been opened for traffic.

The line is in two sections, the easterly one, as previously reported, extending from the Don station on the G.T.R. north and westward until it forms a junction with the Northern near Eglington avenue, the length being about 8½ miles.

The westerly section commences at Carlton station on the main line of the G.T.R. and extends westerly for about 1½ miles, thence southerly crossing the Credit Valley a short distance east of Lambton station and continuing to the Great Western Railway, which it connects with at Swansea, the length being about 4⅓ miles.

It is the intention I understand to ultimately connect the two sections, but no steps have yet been taken in that direction.

The Parry Sound Colonization Railway.

The construction of this railway, which as previously reported, was commenced, in the month of June, 1890, has been continued during the present year, and I am informed that the grading for a length of 20 miles is now completed, and that 18 miles of track have been laid and a similar distance ballasted.

It is expected that the entire line will be completed about the 1st of December, 1892.

Port Arthur, Duluth and Western Railway.

Construction work has been vigorously prosecuted on this railway during the present year, and I understand that the line is now graded for a length of about 72 miles, and that the track is laid and the roadbed ballasted for a length of 70 miles.

A spur has also been laid across lots 20, 21 and 22 in the 1st concession north, Township of Neebing, extending from the main line to the Kaministiqua River, the length being about 3,700 feet, and a loop about two miles in length extending into Fort William East, has also been constructed.

It is expected that the line will be completed to its terminus at the westerly end of Gun Flint Lake about midsummer of the coming year.

Grand Trunk, Georgian Bay and Lake Erie Railway—Owen Sound Extension

This line is intended to extend from Parkhead on the Stratford and Huron Railway to the town of Owen Sound, a distance of about 13½ miles. The survey I understand, was made in the month of October last, and the line has been graded for a length of about a mile at Parkhead. It is expected the railway will be completed and opened for traffic during the coming year.

I conclude my report in the usual manner by furnishing a revised statement to the close of 1891, giving in detail the mileage of each railway in Ontario and distinguishing between those constructed prior to and since Confederation.

REVISED STATEMENT.

No.	Name of Railway.	Terminal Points.		Completed prior to Confederation.	Completed since Confederation.	At present under Construction or Contract.
		From.	To.	Length in Miles.	Length in Miles.	Length in Miles.
1	Grand Trunk Railway, Main Line	Eastern Province Boundary.	Point Edward	457		
2	do Buffalo & Lake Huron Branch	Fort Erie	Goderich	158		
3	do London Branch	St. Mary's	London	23		
4	do Galt & Doon Branch	Galt	Berlin	7	4.5	
5	do Waterloo Junction Railway	Waterloo	Elmira		10.25	
6	do Toronto & Nipissing Branch	Toronto	Coboconk		88	
7	do Midland Railway, Main Line	Port Hope	Midland City	65	54.53	
8	do do Peterboro Branch	Millbrook	Lakefield	13	9	
9	do Lake Simcoe Junction	Stouffville	Jackson's Point		26.5	
10	do Whitby, Port Perry & Lindsay	Whitby	Lindsay		46	
11	do Victoria Railway	Lindsay	Haliburton		55.81	
12	do Grand Junction Railway	Belleville	Peterborough		64 65	
13	do Belleville & North Hastings	Grand Junction Railway	Madoc		22	
14	do Toronto & Ottawa, Main Line	Peterborough	Cassel.nan		9	173
15	do do Manilla Link	Wick	Manilla		6.5	
16	do do Omemee Link	Omemee	Peterborough		14	
17	do Port Dover and Lake Huron	Port Dover	Stratford		63	
18	do South Norfolk Railway	Simcoe	Port Rowan		17	
19	do Chemong Branch	Peterborough	Chemong Lake		9	
20	do Stratford and Huron	Stratford	Wiarton		106.27	
21	do Owen Sound Extension	Parkhead	Owen Sound			13.50
22	do Georgian Bay & Wellington	Palmerston	Durham		26	
23	Grand Trunk Railway, Great Western Div., Main Line	Suspension Bridge	Windsor	229		
24	do Toronto & Hamilton Branch	Toronto	Hamilton	39.5		
25	do Loop Line Division	Glencoe	Fort Erie		145	
26	do Sarnia Branch	Komoka	Sarnia	51		
27	do Petrolea Branch	Wyoming	Petrolia	7		
28	do Brantford Branch	Harrisburgh	Brantford	8		
29	do Brantford & Norfolk	Brantford	Tilsonburgh		35.88	
30	do Wellington, Grey & Bruce	Harrisburgh	Southampton	27	102	
31	do do S. Extension	Palmerston	Kincardine		66	
32	do London, Huron & Bruce	Hyde Park Junction	Wingham		69.75	
33	do London & Port Stanley	London	Port Stanley	25		
34	do Welland Railway	Port Colborne	Port Dalhousie	25		

35	Northern Railway, Collingwood Line	Toronto	Meaford	94	21	
36	do Muskoka Branch	Barrie	Gravenhurst		53	
37	do Hamilton & Northwestern, Main Line	Port Dover	Allandale		135.3	
38	do do Collingwood Branch	Clarksville	Collingwood		40	
39	do North Simcoe Junction	Colwell	Penetanguishene		33.34	
40	Northern & Pacific Junction Railway	Gravenhurst	La Vause		111.5	
41	Canadian Pacific Railway, Main Line	Ottawa	Western Province Boundary	57	1144	
42	do Algoma Branch	Sudbury Junction	Sault Ste. Marie		180.25	
43	do Brockville & Ottawa Railway	Brockville	Carleton Place	46		
44	do St. Lawrence & Ottawa Ry. and Chaudiere Branch	Prescott	Ottawa	59.5		
45	do Ontario & Quebec Railway	Toronto Junction	Eastern Province Boundary	12	281.25	
46	do do Don Branch	Main Line	Toronto		5	
47	do do Detroit Extension	London	Windsor		112.50	
48	do Credit Valley Ry., Main Line	Toronto	St. Thomas		119.13	
49	do do Orangeville Branch	Streetsville	Elora and Orangeville		62.83	
50	do do Guelph Branch	Campbellville	Guelph		15	
51	do Toronto, Grey & Bruce, Main Line	Toronto	Owen Sound		122	
52	do do Teeswater Branch	Orangeville	Teeswater		73	
53	do do Wingham Branch	Glenannan	Wingham		4.75	
54	do West Ontario Pacific Railway	Woodstock	London		27	
55	do South do	Toronto	Hamilton			40
56	Canada Southern Railway, Main Line	Fort Erie	Amherstburg		229	
57	do St. Clair Branch	St. Thomas	Courtwright		62	
58	do Essex Cut-off	Essex Centre	Sandwich		15.5	
59	do Niagara Branch	Niagara	Fort Erie	30		
60	Canada Atlantic Railway	Ottawa	Eastern Province Boundary		68.08	
61	Cobourg, Peterboro' & Marmora Ry., Marmora Line	Cobourg	Harwood	22		
62	Kingston & Pembroke Railway	Kingston	Renfrew		103	
63	Prince Edward County Railway	Picton	Trenton at G. T. R.		32.44	
64	Central Ontario Railway	Trenton at G. T. R.	Coe Hill		74	
65	Erie & Huron Railway	Rondeau	Sarnia		70.47	
66	Napanee, Tamworth & Quebec Railway	Napanee	Tweed		50	
67	do do Harrowsmith Branch	Yarker	Harrowsmith		7	
68	Bay of Quinte Railway	Deseronto	Grand Trunk Railway		3.5	
69	Nosbonsing & Nipissing Railway	Lake Nipissing (S. E. Bay)	Lake Nosbonsing		5	
70	Ontario & Sault Ste. Marie Railway	Sault Ste. Marie	Spanish River			125
71	Irondale, Bancroft & Ottawa Railway	Kinmount	Bancroft		10	40
72	Brockville, Westport & Sault Ste. Marie	Brockville	Sault Ste. Marie		45	455
73	St. Catharines & Niagara Central Railway	Niagara Falls	Toronto		12.5	62.5
74	Lake Erie, Essex & Detroit River Railway	Walkerville	Leamington		38	
75	Port Arthur, Duluth & Western Railway	Port Arthur	Gun Flint Lake		70	14.75
76	Parry Sound Colonization Railway	Scotia	Parry Sound		18	31
77	Toronto Belt Line Railway, Easterly Section	Don Station G. T. R.	Junction with Northern Ry.		8.50	
78	do do Westerly do	Carlton on G. T. R.	Swansea		4.33	
				1455.00	4517.81	954.75

In addition to the work referred to in the foregoing details, the Grand Trunk Railway have constructed a link, about five miles in length, connecting the St. Clair tunnel with the main line at Blackwell Station, in the Township of Sarnia, the work being completed and opened for traffic in the month of November last and I understand that double track has been laid on the Toronto Branch between Waterdown and Mimico, a distance of 27 $\frac{59}{100}$ miles; and on the Sarnia Branch, from Wyoming to Petrolia Junction, a distance of 1 $\frac{16}{100}$ miles.

The main line between Toronto and Montreal has also been double tracked between Gananoque Junction and Napanee, a distance of 43 $\frac{51}{100}$ miles, and from Grafton to Port Hope viaduct, a distance of 14 $\frac{10}{100}$ miles, and $\frac{99}{100}$ of a mile have been laid at Belleville.

I have the honour to remain, sir,
Your obedient servant,

ROBT. McCALLUM,
Engineer Public Works.

STATEMENTS

OF THE

ACCOUNTANT

AND

LAW CLERK.

No. 1.—Statement of Expenditures on Public Buildings and Works in 1890 and 1891, and Total Expenditures up to the 31st of December, 1891. (Capital account).

NAME OF WORK.	Expenditures from 1st July, 1867, to 31st December, 1889.	Expenditures, 1890.	Expenditures, 1891.	Totals.
	$ c.	$ c.	$ c.	$ c.
New Parliament and Departmental Buildings, Queen's Park:				
Lionel Yorke, on contract for masonry, brickwork, etc.	260,320 77			260,320 77
Carroll, Gaylord & Vick, on contract for masonry, brickwork, etc	69,865 26	120,927 63	117,092 10	307,884 99
Lionel Yorke, on contract for carpentry and iron work	8,705 53			8,705 53
Lionel Yorke, Estate, on contract for carpentry and iron work	6,397 08	11,003 72	27,543 68	44,944 48
Lionel Yorke, for bricks furnished	12,037 05			12,037 05
Central Prison, "	30,000 00			30,000 00
St. Lawrence Foundry Co., on contract for iron work	27,206 85	7,160 02	5,209 05	39,575 92
A. H. Rundle, on contract for plastering, etc			9,315 02	9,315 02
Purdy, Mansell & Mashinter, on contract for plumbing, steam warming, etc.			15,595 90	15,595 90
Douglas Bros., on contract for roof covering, etc			24,724 04	24,724 04
Wagner, Zeidler & Co., on contract for interior wood-work, etc			1,538 33	1,538 33
Payments to Mr. Waite, as Architect	16,000 00	3,000 00	5,000 00	24,000 00
Sundry other expenditures (*re* competitive plans, water mains, drains, advertising tenders, etc)	21,281 37	11 05	2,330 31	23,622 73
	451,813 91	142,102 42	208,348 43	802,264 76
Government House	169,563 97		1,848 00	171,411 97
Parliament and Departmental Buildings (old)	85,285 98			85,285 98
Asylum for the Insane, Toronto	298,258 00	5,320 05	4,369 80	307,947 85
" " Mimico Branch	178,097 04	171,931 04	109,858 80	459,886 88
" London	735,400 95	22,424 17	31,798 51	789,623 63
" Hamilton	663,260 31	19,699 13	43,998 36	726,957 80
" Kingston	321,088 22	7,688 16	14,496 71	343,273 09
" (Branch) Kingston	9,422 82			9,422 82
Asylum for Idiots, Orillia	292,081 72	104,477 89	83,282 73	479,842 34
Deaf and Dumb Institution, Belleville	233,856 80	8,842 42	15,684 63	258,383 85
Blind Institution, Brantford	233,615 45	3,856 80	6,583 03	244,055 28
Reformatory for Boys, Penetanguishene	140,311 48	6,359 36	7,310 38	153,981 22
Agricultural College, Guelph	344,874 59	5,811 22	17,077 15	367,762 96
Central Prison, Toronto	677,671 66	10,742 27	4,392 64	692,806 57

See Note.★

NOTE.—★*These items cover the expenditure by Public Works Department in respect of the construction of the new buildings, but do not include the amount paid Toronto University for the old Asylum premises. The quantity of bricks for which payment has been made to Mr. Yorke is to be deducted from the quantity which, by the contract, is agreed to be furnished from the Central Prison.*

No. 1.—Statement of Expenditures on Public Buildings and Works—(Capital Account.)—*Continued.*

NAME OF WORK.	Expenditures from 1st July, 1867, to 31st December, 1889.	Expenditures, 1890.	Expenditures, 1891.	Totals.
	$ c.	$ c.	$ c.	$ c.
School of Practical Science, Toronto, (old building)	59,100 26			59,100 26
" " " (new building and addition)	88,329 54	52,914 85	35,151 07	176,395 46
Andrew Mercer Reformatory for Females, Toronto	192,054 24	2,865 67	4,536 75	199,456 66
Osgoode Hall, Toronto	117,065 24	3,815 46	7,897 62	128,773 32
Agricultural Hall, Toronto	324 00			324 00
Educational Department and Normal and Model Schools, Toronto	113,403 16	11,420 77	5,984 41	130,808 34
Normal and Model Schools, Ottawa	154,072 29	6,000 00	12,911 66	172,983 95
Government Farm, Mimico	51,646 34			51,646 34
Brock's Monument, Queenston Heights	3,636 76	119 50	84 75	3,841 01
Niagara River Fence	8,025 43			8,025 43
Muskoka District.—Immigration Sheds at Gravenhurst	355 00			355 00
" Registry Office and Lock-up, Bracebridge	7,346 11	868 20	66 91	8,281 22
" Lock-up and Court Room at Huntsville	7,383 67		187 00	7,570 67
Algoma District.—Court House, Gaol and Registry Office, etc., Sault Ste. Marie	19,457 40	3,258 50	219 47	22,935 37
" Grand Manitoulin Island—three Lock-ups—(Gore Bay, Little Current and Manitowaning)	13,502 64	1,861 15	8 00	15,371 79
" Lock-up at Killarney	1,272 97	20 00		1,292 97
" " Bruce Mines	3,117 48			3,117 48
" " Thessalon	1,183 79			1,183 79
Thunder Bay District.—Registry Office and Lock-up, Port Arthur	20,564 99			20,564 99
" Addition to Gaol and Court House, Port Arthur	15,404 71	674 37	78 90	16,157 98
" Lock-up at Fort William	7,557 23	12 00	28 35	7,597 58
" " Silver Islet, Lake Superior	2,304 79			2,304 79
Parry Sound District.—Registry Office, Lock-up, etc., Parry Sound	15,485 51	1,191 27	435 21	17,111 99
" Lock up at Maganetawan	631 40			631 40
" Lock-up and Court Room at Burk's Falls	5,540 39	18 50	69 67	5,628 56
Nipissing District.—Lock-up at Mattawa	3,283 41			3,283 41
" Lock-up and Court Room at North Bay	15,260 41	123 75	292 18	15,676 34
" Registry Office at North Bay	2,789 95			2,789 95
" Lock-up at Sudbury	2,178 43	618 42	184 49	2,981 34
Rainy River District.—Lock-up, Court Room and Gaoler's Residence at Rat Portage	19,960 17	227 04	89 21	20,276 42
" New Registry Office, Rat Portage			3,037 08	3,037 08
" Lock-up, Fort Francis			56 00	56 00
County of Haliburton.—Registry Office at Minden	3,749 62	26 55	224 30	4.000 47
Lock at Young's Point	30,892 72	300 00		31,192 72
Lock at Balsam and Cameron Lakes	23,959 02			23,959 02

Lock and Works, Mary's and Fairy Lakes	53,350 75	6,595 90	3,554 42	63,501 07
Maganetawan Works.—Lock, Dam and River Improvements, and Dam and Slide at Deer Lake	47,886 88	600 00	3,989 06	52,475 94
Georgian Bay Works	5,085 37			5,085 37
Landing Pier at Port Elgin	1,000 00			1,000 00
" Southampton	300 00		1,000 00	1,300 00
Muskoka Lakes Works	9,803 70	717 16	192 51	10,713 37
" Lock and Bridges at Port Carling	42.190 71	415 33		42,606 04
" Cut and Bridges at Port Sandfield	16,842 86			16,842 86
" Muskoss Falls Works and Bridge at Bala	7,223 96			7,223 96
Nipissing Lake Works	9,182 17			9,182 17
Couchiching Lake Works	427 84			427 84
Mud Lake Works, (Township of Dalton)	1,502 32			1,502 32
Kushog Lake Dam	300 00			300 00
Mississicua Lake Dam		4,707 88	281 96	4,989 84
Lake of Bays—Dredging mouth of river at outlet of	581 82			581 82
Peninsula Creek Improvement	19,007 40		6,081 46	25,088 86
Stony Creek Works (Township of Ops)	828 25			828 25
Scugog Lake Works, Dredging at Port Perry	977 53			977 53
Lake Scugog, Flats Road			1,500 00	1,500 00
Gull and Burnt River Works	68,526 57	1,994 24	2,450 33	72,971 14
Muskoka River Works	38,198 93			38,198 93
Sydenham "	2,156 26			2,156 26
Nottawasaga "	5,915 09			5,915 09
Kaministiquia "	22,865 02			22,865 02
Scugog " (including Lindsay Lock and Swing Bridges)	85,333 32	4,398 48	2,558 23	92,290 03
Pigeon "	4,999 62			4,999 62
Otonabee "	7,266 66			7,266 66
Balsam "	15,592 95			15,592 95
Wye "	5,176 98			5,176 98
Nation "	10,877 23			10,877 23
Beaudette " (to aid Dredging, etc)	1,500 00	1,500 00		3,000 00
Mississippi River Improvements (below Carleton Place)	1,464 35	1,413 04		2,877 39
Head " (Townships of Laxton and Carden)	976 82			976 82
Moira " (Township of Thurlow)	2,135 22			2,135 22
Trent River Bridge	2,000 00			2,000 00
Washago and Gravenhurst Road	32,792 12			32,792 12
Washago Wharf	489 22			489 22
Portage du Fort Bridge	5,247 99			5,247 99
Des Joachim's Rapids, Bridge and Approaches	5,937 72			5,937 72
Surveys, Inspections, Arbitrations and Awards	42,756 36	476 95	458 58	43,691 89
Maintenance of Locks, Dams, Slides, Bridges, etc	69,108 48	7,619 87	9,191 21	85,919 56
Roads in Township of Ryerson	7,295 06			7,295 06
Clearings and Log House on Free Grant Lands (Settlers' Homestead Fund)	16,780 75			16,780 75
Aldborough Drainage Works	7,199 02			7,199 02
Brooke "	34,747 73			34,747 73
Delaware "	5,740 93			5,740 93
Dunwich "	10,105 86			10,105 86
Ekfrid, Caradoc and Metcalf Drainage Works	13,667 66			13,667 66
Grey Drainage Works	8,175 47			8,175 47
Moore "	17,091 58			17,091 58

No. I.—Statement of Expenditures on Public Buildings and Works—(Capital Account).—*Concluded.*

NAME OF WORK.	Expenditure from 1st July, 1867, to 31st December, 1889.	Expenditures, 1890.	Expenditures, 1891.	Totals.
	$ c.	$ c.	$ c.	$ c.
Mosa Drainage Works	12,714 75			12,714 75
Nissouri West Drainage Works	8,178 50			8,178 50
Raleigh Drainage Works	36,409 64			36,409 64
Russell "	11,543 77			11,543 77
Sarnia "	40,540 55			40,540 55
Sombra "	53,169 04			53,169 04
Tilbury East "	35,297 62			35,297 62
Tilbury West "	31,577 06			31,577 06
Williams East "	2,221 75			2,221 75
Surveys and Drainage of Swamp Lands, (Provincial Account)	36,448 51			36,448 51
Totals	6,882,150 69	626,029 78	651,849 96	8,160,030 43

DEPARTMENT OF PUBLIC WORKS, ONTARIO.
TORONTO, *January*, 1892.

J. P. EDWARDS,
Accountant,
Public Works Department.

No. 2.—Contracts and Bonds entered into with Her Majesty during 1891.

Date.	Work.	Subject of Contract.	Contractor.	Sureties.	——	Amount.
1891 Jan. 29...	Asylum for Idiots, Orillia.	Construction of heating and plumbing works in additional apartments in basement of the main building	James B. Fitzsimons and Alexander Keith, (Keith & Fitzsimons) of Toronto.	None	....	$ c. 975 00
Feb. 3....	Muskoka Lakes Works..	Timber for lock gates at Port Carling.	Thomas Burgess, Junior, of Bala, County of Simcoe.	None	Per M. ft., board measure	14 25
Feb. 10...	Asylum for Idiots, Orillia.	For fitting up rooms in basement of the main building, apartments for refrigerator and scullery and for paving courts.	John Forin, of the City of Belleville.	None	.....	5,000 00
April 22..	Maganetawan River Works.	Timber for building dredge and scows.	Wm. McLachlan, of the Village of Maganetawan.	Alex. H. McLachlan and Wm. Sawyer, both of the Village of Maganetawan.	Pine timber per M. ft., board measure ..... . Oak timber per M. ft., board measure..... .	16 00 30 00
April 24..	New Parliament and Departmental Buildings for Ontario.	Plumbing and gas fitting, and also steam warming and ventilating, etc.	Alexander S. Purdy, William Mansell and Watson Mashinter, of Toronto.	James Morrison and Daniel Kirkpatrick, both of Toronto.	....	76,800 00
April 24..	New Parliament and Departmental Buildings for Ontario.	Lathing and plastering, etc.	Arklas H. Rundle, of Toronto.	Edward Terry and Robert J. Fleming, both of Toronto.	....	37,770 00
April 27..	Mary's and Fairy Lakes Works.	Timber for crib work below the Lock.	William Whiteside and Robert Young, both of Huntsville.	Thos. Goldie and James Fisher, both of Huntsville.	Hemlock timber (sawn), per M.ft., board measure	10 00
April 27..	Peninsula Creek Works.	Timber for cribbing on the Canal.	William Whiteside and Robert Young, both of Huntsville.	Thos. Goldie and James Fisher, both of Huntsville.	Hemlock timber (sawn), per M.ft., board measure	10 00

No. 2.—Contracts and Bonds entered into with Her Majesty during 1891—*Continued.*

Date.	Work.	Subject of Contract.	Contractor.	Sureties.	——	Amount.
1891						$ c.
May 6.....	New Parliament and Departmental Buildings for Ontario.	Roof covering, viz.: slating, copper work, tin work, and iron work sundries.	Thos. W. Douglas, Walter Bell and Asa Matthews, (Douglas Bros.) of Toronto	George Duthie, junior, and Edward J. Cousins, both of Toronto.	.....	44,497 00
May 12.....	Gull and Burnt River Works.	Hemlock timber for dam and slide at outlet of White Lake.	John Flood, of Irondale, in the Township of Glamorgan.	James Flood and Robert Gartshore, both of Irondale.	Hemlock timber per lineal foot	0 10
May 19.....	Asylum for Idiots, Orillia.	Construction of three cottages for employés.	James R. Eaton, of the Town of Orillia.	Mellville Millar and Wm. M. Harvey. both of Orillia.	.....	3,441 00
May 19.....	Educational Department and Normal and Model Schools, Toronto.	Alterations in the Assembly Hall.	William Clarke, of Toronto..	Matthew O'Connor and Joseph Power, both of Toronto.	.....	3,596 00
May 30.	Agricultural College, Guelph.	Reconstruction of two water closets in the Main Building.	H. L. Walker and Richard Mahony, junior, both of Guelph.	None	....	160 00
June 4	Mimico Branch Asylum.	Erection of two Cottages for Refractory Patients.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Patrick Larkin, Philip Begy and George Alexander Begy, all of St. Catharines.	.....	37,750 00
June 4	Mimico Branch Asylum.	Steam fitting in two Cottages for Refractory Patients.	Alex, S. Purdy, William Mansell and Watson Mashinter, all of Toronto.	James Morrison and John M. Taylor, both of Toronto.	....	3,485 00
June 4 ...	Mimico Branch Asylum.	Wiring for electric lighting two Cottages for Refractory Patients.	Henry S. Thornberry and Horace D. Thornberry, both of Toronto (Toronto Electrical Works).	None	....	367 00

June 23	Agricultural College, Guelph.	Sheeting ceilings of reading room, kitchen and laundry in Main Building.	Alexander Bruce and George R. Bruce, both of Guelph (A. Bruce & Son).	None.		163 63
June 25	Educational Department and Normal and Model Schools, Toronto.	Wiring the Assembly Hall for electric lighting.	The Toronto Incandescent Electric Light Company (Ltd.) of Toronto.	None.		130 00
July 18	Normal School, Ottawa.	Construction of water closets, etc.	The Sanitary Plumbing Co. of Ottawa (O. Higman).	None.		700 00
July 18	Normal School, Ottawa.	Excavating, brick and carpentry work, painting, plastering, etc.	James White, of Ottawa.	None.		825 00
July 18	Osgoode Hall, Toronto.	Painting outside brick, stone and wood work of the west wing.	Matthew O'Connor, of Toronto.	None.		875 00
July 18	Institution for the Deaf and Dumb, Belleville.	Re-shingling Bursar's house and tile drain from boiler house to the main sewer.	Thomas Hanley and Frank Dolan, both of Belleville.	None.		600 00
July 24	Asylum for the Insane, London.	Iron pipe and materials for re-construction of steam heating main building and wings.	Wm. J. McGuire (Wm. J. McGuire & Co.) of Toronto.	None.		1,288 00
August 5	Parliament and Departmental Buildings and Institutions, Toronto.	Coal and wood for 1891-2.	Conger Coal Co. (Limited), Toronto.	George L. Whiton and Albert J. Forster, both of Toronto.	Scranton or Pittston large egg, small egg, stove size, nut size per ton. Massilon soft, per ton Hardwood per cord Pine wood " Charcoal per barrel	 5 20 4 80 5 00 3 00 1 00
August 5	Normal School, Ottawa.	Coal 1891-2	C. C. Ray and James Cowan, both of Ottawa (C. C. Ray & Co).	D. Murphy and Hon. Francis Clemow, both of Ottawa.	Scranton or Pittston large egg, per ton Soft coal	 5 75 8 00

No. 2—Contracts and Bonds entered into with Her Majesty during 1891.—*Continued.*

Date.	Work.	Subject of Contract.	Contractor.	Sureties.	——	Amount.
1891						$ c.
August 5	Normal School, Ottawa.	Wood, 1891-2	John Henry, of Ottawa	James O'Connor and Frank O'Reilly, both of Ottawa.	Hardwood per cord	4 75
					Pine wood per cord	3 00
August 5	New Parliament and Departmental Buildings for Ontario.	Interior wood-work and hardware.	George P. Wagner and Carl Zeidler, both of Toronto Junction.	Jacob P. Wagner and Theodore A. Heintzman, both of Toronto.	.....	119,900 00
August 5	New Parliament and Departmental Buildings for Ontario.	Painting, hardwood finishing and glazing.	Richard J. Hovenden of Toronto.	John R. Bailey and Robt. Snarr, both of Toronto.	.....	23,325 00
August 5	New Parliament and Departmental Buildings for Ontario.	Grand staircase and ornamental grille work, etc.	Horatio C. Harrower of the City of Buffalo, N.Y. State.	Robert Snarr and Frederick D. Brown, both of Toronto.	.....	21,991 00
August 6	Asylum for the Insane, Kingston.	Construction of slaughter-house, cow house and piggery.	John McLeod of Kingston..	James Maxwell and Andrew Mills, both of Kingston.	.....	12,950 00
August 6	Mimico Branch Asylum.	Tank house, tanks, pumping-house, drains, etc., sewage disposal and grading and construction of roads and fences at cemetery.	Alexander J. Brown of Toronto.	John J. Pearce and James J. Brown, both of Toronto.	....	5,816 00
August 6	Reformatory for females at Toronto.	Construction of a steam boiler and alteration and repair of one steam boiler.	John Perkins, of Toronto ...	W. N. Blashford and John Johnston, both of Toronto.	....	900 00

August 6	Reformatory for Boys, Penetanguishene.	Construction of three boilers and setting of same in boiler house and laundry.	John Abell, of Toronto ..	Henry Abell and Charles J. Agar, both of Toronto.	.....	1,497 00
August 6	Normal School, Ottawa.	Erection of an addition thereto.	John J. Lyons, of Ottawa...	George P. Brophy and Charles Laporte, of Ottawa.	.....	21,490 00
August 6	Government House, Toronto.	Erection of a gardener's cottage.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Patrick Larkin and Geo. A. Begy, both of St Catharines.	.....	2,220 00
August 6	Asylum for Idiots, Orillia.	Terrace in front of main building and gate entrances and fences.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Patrick Larkin and Geo. A. Begy, both of St. Catharines.	.....	4,000 00
August 6	Institution for the Deaf and Dumb, Belleville.	Construction of an ice house and an addition to bakery.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Patrick Larkin and Geo. A. Begy, both of St. Catharines.	.....	1,750 00
August 6	Institution for the Blind, Brantford.	Erection of a gymnasium in rear of the west wing.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Patrick Larkin and Geo. A. Begy, both of St. Catharines.	.....	2,780 00
August 6	Asylum for the Insane, Hamilton.	Construction of a barn, a horse stable and a root house.	Frederick W. Schwendimann, of the Village of Drayton.	Robt. McWilliam, M.D. and Wm. H. Whealey, both of Drayton.	.....	14,417 00
August 6	Asylum for the Insane, London.	Construction of a slaughter house, a coal shed, and sundry repairs to roof, etc.	John Purdom, of London....	Thomas H. Purdom and Alexander Purdom, both of London.	.....	9,335 00
Sept. 10.....	Normal School, Ottawa.	Covering of deck roof, etc...	James White, of Ottawa	None	.....	283 50
Sept. 18.....	Agricultural College, Guelph.	Construction of a lecture hall and green-houses and the erection of a convocation hall and gymnasium.	John Damp, of Toronto	Joseph McCausland and Wm. L. Scott, both of Toronto.	.....	17,900 00

No. 2—Contracts and Bonds entered into with Her Majesty during 1891—*Continued.*

Date.	Work.	Subject of Contract.	Contractor.	Sureties.	——	Amount.
1891						$ c.
Sept. 18.....	Institution for the Deaf and Dumb, Belleville.	Construction of sewage disposal works.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Frank P. Begy and Geo. A. Begy, both of St. Catharines.	.....	5,700 00
Sept. 18.....	Asylum for the Insane, Hamilton	Construction of water tank, house for fire apparatus and hose tower, and of a cottage for the engineer and fencing near new pumping house.	John Dickenson and Edward Dickenson, junior, both of North Glanford.	Edward Dickenson, Sr., of North Glanford, and John F. Monck, of Hamilton.	.....	7,300 00
Sept. 18.....	Mimico Branch Asylum.	Construction of a gate lodge and of a house for working patients.	William Clarke, of Toronto.	Lawrence J. Cosgrove and Joseph Power, both of Toronto.	.....	5,900 00
Sept. 21.....	Rainy River District ...	Construction of a Registry Office at Rat Portage.	James Craig, of the Town of Barrie.	John J. Brown and Geo. Ball, both of the Town of Barrie.	.....	2,900 00
Oct. 1.....	Asylum for the Insane, Hamilton.	Sundry repairs to roof of main building, east house and orchard house.	John Dickenson and Edward Dickenson, junior, both of North Glanford.	None	.....	672 00
Oct. 17	New Parliament and Departmental Buildings for Ontario.	Piping, hydrants, valves and the sundry works in connection with the fire extinguishing system.	Wm. J. McGuire (Wm. J. McGuire & Co.) of Toronto.	Owen Neily and Thomas Douglas, both of Toronto.	.....	1,102 70
Oct. 20	Institution for the Blind, Brantford.	Erection of an addition to lodge	Thomas Large of Brantford.	None	.....	459 00
Nov. 5	Asylum for the Insane, London.	Sundry alterations in main building.	John Purdom, of London....	None	.....	785 00

Nov. 24	New Parliament and Departmental Buildings for Ontario.	Construction of outer drainage.	Wm. C. W. Garson and Henry J. Purcer, both of St. Catharines.	Frank P. Begy and Geo. A. Begy, both of St. Catharines.		5,490 00
Nov. 25	Districts of Muskoka and Parry Sound.	Hot air, heating Burk's Falls Lock-up and Huntsville Court Room and Lock-up.	Matthew C. Drew, of the Village of Burk's Falls.	None	$250.00 each	500 00
Nov. 25	District of Nipissing	Hot air, heating Court Room and Lock-up. North Bay.	John B. Graham, of North Bay (Graham & Co).	None		285 00
Nov. 27	Agricultural College, Guelph.	Construction of a soft water tank.	John Damp, of Toronto.	None		1,439 00
Dec. 23	Mimico Branch Asylum.	Construction of heating apparatus in the cottage for farm patients.	The E. & C. Gurney Co'y. (Limited), of Toronto.	None		133 00
Dec. 23	Asylum for the Insane, Kingston.	Construction of a duplex fire pump.	Julia H. Northey and John P. Northey (Northey & Co.) of Toronto.	None		1,015 00
Dec. 23	Belleville Institution for the Deaf and Dumb.	Setting up of an old pump and construction of a new pump for sewage disposal.	Julia H. Northey and John P. Northey, (Northey & Co.) of Toronto.	None		470 00

Department of Public Works. Ontario,
Toronto, *January* 1892.

J. P. EDWARDS,
Law Clerk,
Public Works Department.

ANNUAL REPORTS

OF THE

DAIRYMEN'S AND CREAMERIES'

ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1891.

I. DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.
II. DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.
III. CREAMERIES' ASSOCIATION OF ONTARIO.

(PUBLISHED BY THE DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
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1892.

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I—DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

OFFICERS FOR 1892.

President - - - - - Wm. Eager, Morrisburg.

1st Vice-President - - - - Wm. Bissell, Algonquin.

2nd Vice-President - - - - Wm. Duff, Inverary.

Directors :

Division No. 1—E. Kidd, North Gower.

" 2—John McTavish, Vancamp.

" 3—Richard Murphy, Elgin.

" 4—James Whitton, Belleville.

" 5—T. B. Carlaw, Warkworth.

" 6—Henry Wade, Toronto.

Secretary - - - - Harford Ashley, Belleville.

Treasurer - - - - - P. R. Daly, Foxboro'.

Auditors - - - - { Morden Bird, Stirling. / W. H. Thompson, Prescott.

LIST OF MEMBERS

FOR 1892.

Name.	Post Office.
Advocate	Trenton.
Ashley, Harford	Belleville.
Andrews, Jacob	Lakefield.
Argus News	Stirling.
Bissell, Wm	Algonquin.
Bailey, Arthur	Campbellford.
Bradshaw, Archibald	Harrowsmith.
Benson, Richard	Picton.
Bensley, Wm	Warkworth.
Bickle, J. W	Cobourg.
Barnum, E. S	Cobourg.
Burnet, Wm.	Cobourg.
Bulger, James	Cobourg.
Bird, T. A	Cobourg
Bonnet, Edward	Melrose.
Barton, Frank	Springbrook
Barton, Isaac	Springbrook.
Bowman, John	Cold Springs.
Bird, Morden	Stirling.
Brenton, F. W	Belleville.
Barton, I. A	Trenton.
Boulton, D. E	Cobourg.
Beaver	Napanee.
Carlaw, T. B	Warkworth.
Clazie, William	Belleville.
Chown & Co	Belleville.
Coyle, John	Roseneath.
Clarke, Samuel	Roseneath.
Clark, William	Meyersburg.
Chisholm, George	Belleville.
Clarke, G. M	Cobourg.
Culver, A	Cobourg.
Carroll, James	Baltimore.
Cullis, R	Camborne.
Coon, John W	Ingersoll.
Cronk, W. N	Cobourg.
Courier	Morrisburg.
Courier	Trenton.
Derbyshire, D	Brockville.
Daly, P. R	Foxboro'.
Duff, William	Inverary.
Davidson, Thomas	Cobourg.
Doyle, M. J	Castleton.
Davidson, James	Camborne.
Drewry, J. S	Warkworth.
Deyell, Ernest	Peterboro'.
Douglass, W	Peterboro'.
Downs, Thomas	Peterboro'.
Daintry, John	Cobourg.
Dempsey, W	Belleville.
Darling, L. A	Morganston.
Dickson, M. A	Cobourg.
Dean, Prof	Guelph.
Eager, William	Morrisburg.
Eager, George	Kemptville.
Elliott, Thomas	Norwood.
Ewing, C. E	Norwood.
Easton, George	Belleville.
Examiner	Peterboro'.
Ensign	Brighton.
Foster, J. G	Moira.
Field, F. M	Cobourg.
Free, H. R	Plainfield.
Fowler, Jos	Mt. Chesney.
Field, C. C	Cobourg.
Field, John P	Cobourg.
Fisher, John	Cobourg.
Fish, E. L	Cobourg.
Floyd, W. H	Cobourg.
Fox, M	Cobourg.
Furguson, A	Baltimore.
Gallagher, J. S	Harrowsmith.
Grosjean, John L	Cobourg.
Guillet, Geo	Cobourg.
Gowans, F. M	Cobourg.
Gilbard, T	Cobourg.
Guide	Port Hope.
Gazette	Picton.
Hinman, P	Grafton.
Hogan, James	Mt. Chesney.
Hume, Thomas	Burnbrae.
Honey, J. G	Orono.
Healy, Owen	Cobourg.
Haggerty, James	West Huntington.
Hargraft, A. R	Cobourg.
Hargraft, John	Cobourg.
Hayden, J. D	Cobourg.
Hooey, W. W	Cobourg.
Hopper, W. H	Cobourg.
Hinman, E. A	Grafton.
Hinman, E. B	Grafton.
Hinman, J. J	Grafton.
Hoskin, Thomas	Grafton.
Hawkey, F	Port Hope.
Hoard, W	Cobourg.
Herald	Campbellford.
Johnston, H. M	Cherry Valley.
Johnston, B. E	Picton.
Jamieson, J. A	Picton.
Jacobs, T. J	Cobourg.
James, M	Bowmanville.
Kidd, E	North Gower.
Keenan, John	Kingston.
Kerr, H	Moira.
Little, W. H	Cobourg.
Lane, James	Pittsferry.
Lowry, John	Frankford.
Macpherson, D. M	Lancaster.
Madden, E. J	Newburg.

List of Members—*Continued.*

Name.	Post Office.
Murphy, Richard G	Elgin.
Mallory, B. J	Cobourg.
Macnachton, H. S	Cobourg.
Mitchell, George	Cobourg.
Mitchell, John	Waupoos.
Minaker, H	Cobourg.
Mulhall, A	Cobourg.
Mallory, C	Cobourg.
Mulholland, Wm	Cobourg.
Moore, A	Orono.
McTavish, John	Vancamp.
McCann, James	Perth.
McGivan, A	Perth.
McCallum, Peter	Cobourg.
McCargar, J. K	Belleville.
McCutcheon, A	Cobourg.
McKague, J	Cobourg
McPherson, D	Cobourg.
McCovy, Hugh	Cobourg.
McQuaid, Mr	Cobourg.
McGovern, Mr	Cobourg.
Noble, George	Tweed.
Niles, William	Tweed.
Newton, John	Cobourg.
News	Kingston.
Northumberland *Enterprise.*	Colborne.
Publow, G. G	Perth.
Philp, Samuel	Baltimore.
Potter, A. J	Mountain View.
Pilkey, Daniel	Peterboro'.
Powell, O. W	Cobourg.
Phippen, E. A	Conway.
Poe, A	Cobourg.
Pope, William	Cobourg.
Pratt, A	Cobourg.
Pratt, J. A	Cobourg.
Ruddick, J. A	Ex. Farm, Ottawa.
Rollins, Robt	Madoc.
Rose, Edwin H	Port Hope.
Russell, J	Cobourg.
Roe, Thomas	Cobourg.
Robinson, G. H	Morven.
Rooney, D	Cobourg.
Rosevear, John C	Cold Springs.
Rosevear, J	Port Hope.
Richardson, C	St. Marys.
Riddell, Walter	Cobourg.
Recorder	Brockville.
Reporter	Gananoque.
Review	Peterboro'.
Review	Madoc.
Spence, S. S	Cottesloe.
Soper, H. S	S. Mountain.
Snelgrove, H. J	Cobourg.
Sherwin, J. A	Grafton.
Spears, Thomas	Cobourg.
Scott, R	Meyersburg.
Staples, W	Grafton.
Smith, S	Chapman.
Sinclair, T	Cobourg.
Spears, William	Cobourg.
Smith, Samuel	Chapman.
Staples, J. H	Grafton.
Stickle, A	Belleville.
Spence, George	Prescott.
Spence, Hugh	Norwood.
Star	Hastings.
Sentinel Star	Cobourg.
Thompson. Robert	Napanee.
Trotter, David	Cushendall.
Thompson, T. J	Springbrook.
Thompson, W. H	Prescott.
Taylor, J	Sarginson.
Topping, M	Athens.
Times	Brockville.
Tribune	Deseronto.
Times	Port Hope.
Times	Picton.
Vandewater, D	Chatterton.
Vindicator	Oshawa.
Wade, Henry	Toronto.
Whalen, Wm	Centreville.
Winter, C. H	Grafton.
Westington, W. J	Plainville.
Williams, M. B	Cobourg.
Wilson, R	Cobourg.
Whitelaw, W. R	Cobourg.
Woods, Albert	Cobourg.
Warrington, J. F	Belleville.
White, Frank	Belleville.
Whitton, James	Wellman's Corners.
Whitton, William	Wellman's Corners.
White, William	Cobourg.
Whig	Kingston.

FIFTEENTH ANNUAL CONVENTION

OF THE

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

The fifteenth annual meeting of the Association was held in the Court Room, Cobourg, on Wednesday and Thursday, January 7th and 8th, 1892, three sessions being held each day. The attendance of members, more particularly on the second day, was large, and all the speakers received close attention.

THE PRESIDENT'S ADDRESS.

When the President, Mr. Wm. Eager, of Morrisburg, took the chair at 10.30 on the morning of the first day the attendance was encouraging. He said, in opening the proceedings: I can assure you, gentlemen, it affords me very great pleasure to welcome you all to this fifteenth annual convention of the Dairymen's Association of Eastern Ontario, and this I do with all heartiness and good will, trusting that once more our efforts will build up to a greater height of prosperity this dairy industry of our Dominion.

Looking back over the past season, it has been a very favorable one for the cheese industry. Although threatened by a severe drouth in the early part of the season it did not last long. Rain came the latter part of June, and from that time until the latter part of October the pastures were exceedingly good and the cows kept up a large flow of milk until the factories closed. Patrons of cheese factories have received a good average price for their milk, the buyers will do well out of the purchases, and altogether the season of 1891 has been a very satisfactory one in the cheese business.

Never in the history of our country have the farmers received so much of the attention of the legislators and economists as at the present time. Both the provincial and federal governments are doing all in their power to asssist the farmers in every way that they possibly can, but we as dairymen should not depend too much on government help. We should rely upon ourselves. The sure road to success is having confidence in our ability to solve the difficult problems that crop up in our business from day to day.

The secret of our success is to discover the forces and tendencies about us, and turn them to our use. Many people spend their time opposing and bewailing the changes that come up in their business, and thus waste their strength fighting against the inevitable. Others with a finer instinct discover the power that lies in this tendency, and set themselves to master the difficulty. It is a notable fact that one who succeeds in great enterprises invariably succeeds in new methods. They discover before the mass of their fellows have found it out, that the time is ripe for some new way of doing things, and they introduce the new way at the proper time.

Business genius lies chiefly in the discernment of new possibilities of the hour by a clear conception of the inevitable changes and swift adaptation to these new conditions. Those who mean to succeed cannot tie themselves down to any particular method, but must be continually on the alert for new and better ways. This does not mean restlessness and

departure from certain fundamental principles which remain unchanged, but it does mean quick perception of the facts that certain methods are outgrown, and that the times demand a change. This is a movement that carries men forward, and the successful man is the man who knows when the tide begins to rise and who rises with it.

Canada leads in the cheese industry on this continent, and our neighbors to the south give us credit for making finer cheese than they do. Doubtless we have gained a reputation for our goods in the English markets, but every year the competition is getting keener as regards the quality of our cheese. Buyers are getting harder to please, and the dealer in England is more particular as regards quality than in years gone by. When this is the case we feel inclined to ask ourselves where will the competition end, and how shall we make finer and better cheese this coming season than we did during the season of 1891? We live in a progressive age, and we must be progressive men if we expect to retain the proud position we now hold with regard to the reputation of our cheese in England.

No man knows all about the dairy, and every patron who sends milk to a factory should try his utmost to have the milk reach the factory in its best condition. Every patron should also remember that a great deal depends on the care and treatment he gives the milk in order that the cheese-maker will have the best results.

The cheese-makers should try if possible to get the milk in a uniform state before commencing to make the cheese. If the milk is in good condition the action of the rennet will be uniform, and will give better results as to quality and quantity. Cheese-makers should aim to have the curd in the same condition every day before commencing to grind. After grinding and salting they will have cheese of fine quality, and if they have the cheese uniform when it goes on the shelves it will be uniform when it comes off the shelves.

The dairy interest of the Dominion is a great one, and is destined to be very much greater. There is a great loss every year in our country on account of not milking our cows ten months instead of seven. This is one reason that dairymen have not made the money they should have from their cows.

The subject of winter dairying will be brought up before the convention, and it is a very important one to the farmers of the Dominion at the present time. It is to be hoped that winter dairying will give us a reputation for our butter in the English markets the same as we have for our cheese. I trust that every man attending the convention will be amply paid for his time and trouble, which I have no doubt he will.

I beg to submit for your approval the following nominations for the various committees:

COMMITTEES.

Business.—Messrs. P. Hinman, D. Derbyshire and W. J. Bissell.
Nominations.—Messrs. H. Wade, Murphy and D. Vandewater.
Dairy Utensils.—Messrs. Rollins, Whitton and Publow.
Finance.—Messrs. H. Wade, McTavish and Kidd.
Legislation.—Prof. Robertson, D. Derbyshire and Riddell.
The committees as above named were accepted by the Convention.

OUTLINING A FORWARD MOVEMENT.

Mr. D. Derbyshire (Brockville) gave the following impromptu address: I desire to congratulate the President upon his able address, and also upon the successful year attending his occupancy of the position. Mr. Eager is a practical man, and a leader in the dairy business of the country. With the exception, perhaps, of Mr. Macpherson, no one has given more time and attention to building up the dairy interests of Eastern Ontario. The quality of the cheese made at your factories has been a credit

to you, Mr. President, and the work done by you for the Association has also been creditable. In regard to the progress of dairying, so nicely portrayed in your address, I may say that there is a little anxiety felt in some quarters that the producers of milk are not taking as much interest as the manufacturers are in keeping up the high reputation of our cheese. Unless the former take more interest in developing the power of their dairies, it will be practically impossible to make further progress in cheesemaking as a commercial industry. Our factories and machinery are in most cases all that can be desired, and our makers are coming to the front as first-class men, and our instructors are making their mark from time to time. But notwithstanding this progress at the factory end, the farmers are practically standing still in regard to the quality of their milk and the quantity they furnish. It must be continually held before patrons that first of all the proper cow must be selected, that she must be cared for in favorable quarters, and that the milk is brought to the factory in its best possible condition. More milk and milk of a better quality is what our dairymen must keep before them as an indispensable requirement of successful dairying. If we stand still, our reputation will soon go. Better food more wisely fed is what the cows need to bring up the milk standard. To the south of us they are making every endeavor to improve dairying ; better machinery and better makers have been procured, and they are giving close attention to intelligent feeding. They are using the schoolhouses to educate the people in this respect. Dairymen of Ontario, we must look to our laurels. Another important question is to the front, and will be discussed to-morrow morning. You all know the amount of time lost by our instructors and inspectors having to give so much personal attention to law-suits. Too much time for instruction work is taken away from the factory by the courts and the various cases arising for settlement outside of the courts. There is one way to head off watering and skimming, and that is by paying a man only for what he brings to the factory. Let him put in water, or skim, if he likes, and he will get just what he brings to the factory from the standard of butter fat. He will get nothing for the water. The honest man will get just what he deserves, and the fellow who would like to make a little out of his neighbors by tampering with his milk will get a slap in the face. I hope this matter will receive full discussion. A longer milking period for cows is also a necessity. A cow cannot earn her living in seven or eight months. She will be the better for it if she is milked and specially fed and cared for during ten months of the year. She will be a better cow and give better results every way. In the late fall get this milk in the separator and to some place where it can be made up into the very finest quality of butter. This is not an experiment. We have had practical results from this plan in the vicinity of Brockville. Last year I encouraged Mr. Johnston, who is running a small factory near Athens, by telling him that if he would continue making I would give him the milk of twenty-two cows. The result was that he made 200 tubs of butter of the finest quality after the regular season. This year, after the ordinary season had closed, he made up to last Saturday 400 packages of superior butter, and the milk has been drawn as far as seven miles to the creamery. This means a distribution of about $3,000 to the enterprising people who have been furnishing this extra milk, and not only are the cows in a better condition, but they and their owners will be in a better way for carrying on business during the present year. I again congratulate the President and members upon the success which has attended the operations of the Eastern Dairymen's Association during the past year.

THE SOIL, THE PLANT, THE COW AND THE PRODUCT.

Mr. D. M. Macpherson (Lancaster) was called upon for an extempore speech, and responded : I fully agree with the remarks which have been uttered regarding the success of the year from a dairy standpoint. There are one or two points, however, which I think are worthy of special consideration. I wish to emphasise the importance of relying upon individual effort rather than upon Government support and bolstering. Each one

must work out his own salvation, so to speak. Opportunities and possibilities are before each of us, and we must work them out for ourselves. The successful dairyman must acquire a measure of knowledge necessary to enable him to produce superior results from year to year, and this can be accomplished only by individual effort, by personal application, and by understanding the laws which govern results. We must have a full acquaintance with our environment and the conditions governing it. A reference has been made to the condition of the milk as received at the factories, both as regards quality and quantity. I have found in my own experience that dairymen are going back in both of these respects. The quality of the milk is not as good as it was ten years ago, and there is less of it received from the cow. There appears to be an actual receding in this matter, and it is rather discouraging, because if both quality and quantity continue to deteriorate it will be a serious thing in say another decade. Let us look for the remedy. Education is a discipline. The cheese manufacturers must prescribe the remedy and bring the manufacturers to see it for themselves. I think that the leading cause of the poorer quality and the less quantity is the fact that the land is getting poorer. The soil is yearly being depleted of the essentials for producing an improved article. The phosphates and nitrates and other mineral essentials to first-class agricultural land are being depleted. The grass cannot get out of the soil that which is not there ; the animal cannot get out of the grass that which is not in it, and the cheesemaker cannot get out out of the milk that which is not in it. The first thing to be done towards an improvement in the quality of the milk is to encourage that which will improve the quality of the land, and when this is done we may look for the fuller success of dairying in this country. But before this question is solved there will have to be many experiments, both of a theoretical and practical nature, and by the best men in the country. The problem to solve is how to return to the soil in the quickest manner and in the cheapest way the necessary essentials to fertility, and then it will be to decide how to give that to the farmers in the best and cheapest form. The accomplishing of this would mean a great deal in aiding the prosperity of the country. The foundation upon which the success of the merchant and mechanic rests is the success of the agriculturist, and the foundation of the farmers' success is the fertility of the soil. I admit that the problem is a most difficult one. During the past ten years I have given it more or less study in my leisure hours and, as concisely as possible, my main point is that we must rely more upon animal products, not only to sell but to return to the soil. In fact this must be our main reliance. We must raise more cattle in this province. We should have one head per acre, and one head for every two acres should be the minimum. When the Ontario farmer can maintain one head to every acre of land he owns he will begin to reap success, for he will be in a position to sell more, to receive a larger money return, and also to return more to the soil, and thus procure a larger product to support his increased number of cattle. In order to accomplish this we must have the stables properly built, and get appliances to aid in the feeding and general care and protection of the stock. It is necessary to study the question carefully in order to perform all this at the least cost, but it must always be remembered that it is impossible to have the best fertiliser without cattle, and it is impossible to keep cattle in the best condition without proper protection. He is a foolish farmer indeed, who leaves his cattle exposed to the inclemency of our winter weather. In times past cattle were so exposed, and it took more feed to sustain them than it now does. And under that old system the manure was so injured that one half of its value was lost. It is well always to bear in mind that what can be produced more cheaply on the farm than it can be purchased should be produced, and what can be purchased more cheaply in the market than it can be produced on the farm should be purchased. Now let us take the factories throughout the country and we will find that the amount of milk received is most inadequate to the expense. But take and double that amount received and you will increase the profits perhaps four times, because it takes a certain amount of milk to meet the expense of production, and over that amount makes the profit for the investment. If the cows are better and more systematically fed they can produce a better quality of milk and more of it, and manufacturers of cheese would get a better reputation. And with agricultural prosperity comes the well-being of every other class of the community.

A PRACTICAL TALK ON WINTER BUTTER-MAKING.

Mr. J. A. Ruddick, of the Central Experimental Farm, Ottawa, was asked to speak concerning his experience in winter dairying, and said: During the past fall Prof. Robertson started a couple of experimental creameries in the county of Oxford, one at Mount Elgin and the other in Woodstock, and I am in charge of the latter. We have adopted the cream gathering system. The patrons there have only a small number of cows, and those who were ready to assist us were scattered over a large territory, and for that reason we decided to gather the cream. Our system of collecting is as follows: One driver starts out with specially constructed cans, having non-conducting sides so as to keep the contents from freezing, and when he arrives at a farm house he takes the cream, which has been left in deep receiving pails, and after measuring the number of inches of cream in the can he samples it, puts a little in the small test tube—about half full. These measurements and records are put in his book, and after he arrives at the factory the samples are tested and reduced to oil, and every man gets credited with the amount of butter which his cream makes, no more and no less. (Hear, hear.) So you will see that if he adds by water or takes away by skimming he gains nothing by it. We have been able to make a first-class quantity of butter so far. The people sending cream have taken hold of the matter with enthusiasm. Over at Mount Elgin where there are more patrons, and the supply of milk is larger they have put in a separator and the patrons are bringing in the whole of the milk to the factory. The other day the manager told me that they had taken in 11,000 pounds of milk in one day.

A Voice.—What about turnips?

Mr. Ruddick.—Nearly every patron is feeding turnips. We have asked them to feed the turnips after milking at night, and not to feed too heavily, and they have done so. There was more trouble experienced in the cheese factory in the fall when the cattle were feeding on the green tops.

A Voice.—Does not Prof. Robertson prescribe feeding with turnips?

Mr. Ruddick.—Of course the butter might be better still without the turnips, but really we have had no trouble to speak of with the flavor. Our patrons are men who have given the matter much attention and they do all they can to assist us. It is well understood that no objectionable milk will be taken.

A Voice.—What do your patrons feed for winter milk?

Mr. Ruddick.—Nearly everything that is usually fed. Four of our patrons have silos. Our largest patron feeds his cows about 40 pounds of ensilage a day. Most of them are using mill feed ground in the neighborhood. Some give a little extra of oats, peas or barley.

A Voice.—Are the deep setting pails covered?

Mr. Ruddick.—Yes.

A Voice.—Do you color the butter?

Mr. Ruddick.—Yes, slightly. We are making for the English market, and do not color so much as if selling for the home market.

A Voice.—What kind of tub do you use?

Mr. Ruddick.—A 50-pound tub, tin lined, made at Newmarket.

A Voice.—How do you pack it?

Mr. Ruddick.—In the first place we sprinkle a little salt on the bottom of the tub, and line it on the inside with butter cloth. This cloth makes a little rind on the butter like that on cheese. The butter is neatly covered with cloth on top, and a thin layer of salt about half an inch thick placed over that. When the tubs are put up we cover them with a linen sack—a sort of slip cover. At Mount Elgin some of the packages are made like a barrel.

A Voice.—What kind of a churn do you use?

Mr. RUDDICK.—The square box churn, holding about 250 gallons. We are churning now at 65°, and the average time it takes to churn is about three-quarters of an hour, according to the quantity in the churn. When the churn is pretty full it takes a little longer. We are letting the cream ripen sufficiently to develop a little acid. We have been making butter for the past six weeks, and expect to run until the end of May.

A VOICE.—Do you instruct the patrons to keep the cream from freezing?

Mr. RUDDICK.—Yes. I may further say in regard to the test that it is something new in that part of the county, being the first in Oxford. Some of the patrons were in doubt at first as to whether we could work a fair division of the proceeds by the test, but before I came away I totalled the number of pounds according to the churn and the number of pounds by the test, and there was only .65 of a pound difference in the whole lot. Of course that is unusually close, but it is the actual result of the six weeks' operations.

A VOICE.—What is the maximum and minimum of variation in the test?

Mr. RUDDICK.—Our scale is arranged to measure so many pounds of butter to the inch. For instance, one sample of milk will make 50 per cent., which means half a pound to the inch, and another sample may go 140 per cent., which means 1 4-10 pounds to the inch. One man has a few stripper cows, and he averaged only 40 per cent.

A VOICE.—What test do you use?

Mr. RUDDICK.—We generally use the Babcock. It is the Curtis oil test churn. There is a scale arranged from a certain measure of fat on the tube, and so many inches gives so many pounds of butter. At Mount Elgin they are using the Alexander separator. We have had no experience with the Sharpless. Very little alteration is required to adapt a cheese factory to winter butter making if the building has been properly put up in the first place. Some factories need practically no alteration, except, perhaps, to be made a little warmer.

A VOICE.—When does the cream come in?

Mr. RUDDICK.—In the afternoon, from noon till four o'clock, and it is churned the next morning. It comes in at a temperature of 40° sometimes, and we warm it up at once to 70°. If it is very sweet we have to heat it a little higher than if it is further advanced. The cream bath is just like a cheese vat, but the latter would be rather large for cream.

ADDRESS BY MR. C. C. JAMES.

Mr. C. C. JAMES, Deputy Minister of Agriculture, was introduced by the President, and said: Hon. John Dryden, Minister of Agriculture, asked me to express to the convention his regret at not being able to be present. At this time of the year nearly all the associations in connection with the Agricultural Department have their annual meetings. There are three in progress just now: the Beekeepers at London; the Poultrymen, at Bowmanville, and the Eastern Association of Dairymen here, and there are other conventions to be held this month. Another reason why the Minister could not be with you is that just now the preparations for the session necessitate the presence of the Ministers in their departments the greater part of the time. However, he was anxious that some one from the Department should be present at your meeting, recognising the great importance of such a gathering and realising that these associations have to play an important part in the agricultural and commercial development of the country. I can assure you that he wishes you the utmost success. Mr. James then gave a few figures outlining the extent of the dairy business of Canada, which are included in the more detailed statement delivered in the afternoon.

The Convention then adjourned until two o'clock p.m.

FIRST DAY—AFTERNOON SESSION.

The Convention resumed work at 2.30, the President calling upon Ex-Governor Hoard, of Wisconsin, for one of his "talks."

A FORWARD MOVEMENT.

Mr. HOARD said: Addressing a gathering of this sort at short notice is a good deal like as the old Hoosier said about sinking an artesian well in a dry place: "You don't know if you will always strike juice." (Laughter). However, I am somewhat like the old canal horse that will scowl and shrink from the collar, but when I am aroused I rather like it. The past year has been in many particulars one of the most suggestive and fruitful of all the years my of life, at least in its contribution to conclusions and judgments along the line of dairy study. We are just commencing to get the dairy business upon a wholesome basis. In Wisconsin, we are trying at least to keep well up with the advance. We know that, as Sir Isaac Newton said, the great ocean of truth lies unexplored before us, and that we have heretofore been as little children wandering upon the shore picking up now and then some rare pebble. But there is an immense amount of practical knowledge, conclusion and judgment yet to gain. To-day, just as it has always been, the great question rests with the man who produces the milk. Cheese factories and creameries have results just in proportion with the average farmer who contributes the milk to these institutions is profited and instructed. Just as the horizon of his judgment is widened, his conclusions made more accurate, and his work rendered more profitable is the work of the cheese factories and creameries made more sure and steadfast. Now we have been striving for years to arouse in the farmer who makes the milk an understanding that he is one of the most important factors in the whole world. It is a good deal, as I said to Prof. Dean to-day, like the construction of a shoe. I was in a shoe factory the other day, and learned that in the making of a very fine shoe there are about thirty departments. A man in each department does a specific work in the making of that shoe as it comes to him, but the final result of his work depends largely upon the excellence of the work ahead of him. If the man who cuts out an upper botches it, no subsequent skill can make it better. And so in the making of butter and cheese. There are many departments, but after all the man who furnishes the milk holds his hand upon the throttle, and decides the outcome of the work of the rest who may handle that product. This dairy business is so knit together that we cannot isolate ourselves. You cannot do anything in this line of work in the Dominion of Canada that is not felt in the pulse of those of us who with similar blood in our veins dwell to the south of the boundary. We have a oneness of conquest in this field. We have to clear away the clouds of error from the minds of men who are in this business. And so let us mutually rejoice that this past year has put us further ahead than we have ever been before, and I think this is greatly owing to the advancement of the principle of paying for the milk according to the value of the cream or butter fat that is in it. (Applause). Our past system has been a perfect kindergarten for petty larceny. We have not been on a wholesome basis, and have experienced the evils attaching to a wrong system. You remember what the old fellow said about the dog: "There aint any use trying to educate that dog, for he wasn't born right to begin with." And so it is with the old dairy method, it began wrong. It sometimes seems as if we could not stop the evils that flow upon us as if from this Pandora box; yet Hope is left. In my own work we have two cheese factories and four creameries. The creameries are run upon the relative value system, and we have every patron now on the jump as we never saw them before, enquiring "Men and brethren, what must we do to be saved?" Now that seems good to an old missionary like myself who has been preaching this gospel for years, and I am now about ready to say with Simeon, "Now, Lord, let thy servant depart in peace." These sayings of Scripture apply very much to the conditions which surround us in our practical work. I believe that we are just on the verge, the opening dawn, of some of the best dairy work we have ever seen in the history of our common continent. We have been studying this question of relative value very largely in Wisconsin, and the more we study it the more we see that we must

as cheese factory and creamery men take the patron along with us. You can see that your actual advance is no faster than his. No chain is stronger than its weakest link, and the patron is a very important link in this matter. We feel that something must be done to educate the patron to an understanding of his place in this work. Now it is not ignorance. The average man who contributes milk to a cheese factory is not usually an ignorant man; he is simply an untrained man. His most frequent complaint is "I cannot get anything practical." What does that word "practical" mean? Farmers use the word very often, but how often does the word come to their lips just because they are impracticable. They are not in harmony with a certain fact, and that fact will not change. The practical man will adjust himself to the fact. What is practical to one man in one condition of intelligence would be considered impracticable to another man in another condition of intelligence.

I have seen a great advance in Wisconsin in one year in the breeding and handling of our cattle—more during this past year than I have ever before observed in the State, Men have taken up this question of the dairy cow just as I have been preaching it for years and have come to the conclusion which I have advocated so long, that this animal must be handled in the proper way or else certain failure will result. And the question of economy in the matter of her food is becoming more and more prominent. The other day I was in Deckertown, N. J., where they are making milk for the New York market, and while in that neighborhood I was greatly interested in what I saw. I was in a district where men were buying cotton seed meal at $30 a ton, linseed meal at $28, bran at $23 and hay at from $12 to $15 per ton, and all this to make milk for city delivery. My face was to the car window from Patterson to Deckertown, watching the dairy farms as I went past them and in the case of 75 per cent. of them, though the thermometer was well down and there was a cold drizzling rain, the cows were ranging the fields in quest of—exercise? (Laughter). When I had opportunity, I said to some of these men, "Sirs, what under the sun are you thinking of? Milk is the dollar, the silver, the gold to you. The production of milk from this bovine mother is just what you are aiming at. What are you thinking of, in paying all this money for feed and handling the animal in this neglectful way?" And an old Jerseymen replied, with a sort of twang in his tone, "Mister, do you think a cow will keep healthy shut up all day?" (Laughter). "Well, she will keep warm?" "Yes, she will keep warm, but will that pay us anything?" These men were studying only one thing—how much would be paid at the other end, and were neglecting the cows at the home end. You dairymen are surrounded by artificial conditions, and if you are to make any money at all it must be made out of conditions surrounding yourselves and not out of those conditions which surrounded your grandfathers. There were these Jersey dairymen wrangling with the New York dealers over an extra half a cent a quart, and pouring it out at the other end. We still need a good deal of education along these lines. I wish to reiterate what I said last year, that we are to take a larger advantage of our cheese factories and creameries. In Wisconsin we have 1,500 cheese factories and creameries. But a lying and contrary spirit took hold of the Wisconsin State Government last year, and a cry went forth against the creameries and cheese factories and farmers' institutes. They thought to cripple the agricultural sentiment of the State. It was said that the farmers were beginning to think for themselves, and in the opinion of some that was hardly the right thing. So they held a caucus to put down the dairy commission which had been started for the benefit of the farming interests. Well, at our dairy conventions the dairy boys, Democrat and Republican, came around and said "What are we going to do? They have acted badly, and they have agreed to down the dairy commission." I said, "Let us stand still and see the salvation of the Lord. We will smite this rock and see whether or not it is moist at the centre" So I went home and drew up a little petition, and had it sent to every cheese factory and creamery in the State. These in turn sent copies to their patrons, and that petition went into the legislature with 80,000 signatures and swept the opposition off its feet. Certain members who wanted to down the dairy commission saw that petition, and they said to the men who were managing the caucus: "Why, there are the names of my neighbors; I cannot vote against that." I tell you, men are not going to commit political hari-kari. (Laughter and applause). That taught me a lesson. No other

interest is organised like the dairy interest. These factories are little school-houses or primaries, as it were. But are we doing all we can to push the work, and get information distributed. Are we endeavoring to replace wrong ideas by furnishing right ones? Is it not in the province of this Association to take hold of these dairy centres scattered all around and begin to institute something practical for the intelligent growth in understanding of the men constituting the patrons of these factories? We who are here see the goal, and press on ahead. We see that quality tells in the end, but owing to the lack of proper instruction in others we cannot bring this question of quality just to where we want it. Is it not possible, however, that we would be doing something practicable if in our dairy organisations we would evolve some simple system of education. Could not patrons be assembled three or four times a year, when you could talk to them about the care of dairy stock? And some able men might edit and send out pamphlets. Here in Ontairo you have taught us some splendid lessons. We sent a man to see you and you taught him some things. I said to him (for he was a Professor and had some conceit in his mind), "These old hard-headed Canucks can teach you something." He came, and did learn something. But in all our speeches and in all our dairy literature we must be careful to make all our conclusions perfectly clear and easy of comprehension. Sometimes these statements are too arbitrary, and there is no reason in heaven or on earth why the thing should be. But give a man a clear reason for anything, and he is very likely to accept it if he sees that it is to his benefit. Do not depend too much upon the dairy press. But in conclusion I would say that things are beginning to brighten. We have been looking through a glass darkly, but now we can see more clearly where our best interests lie. I get much inspiration in my dairy work by coming among you. I once knew a poor soldier, in Louisiana, who was sick with the black fever. He said, "My, my, but I would like to get one more whiff of New York breath!" I find it is a grand thing for me to come over here and get a good whiff of Canadian breath. It is good ozone. We are trying to get as many of you as we can to come to us, and I am free to confess that I would rather get one good Canadian than forty ignorant European immigrants or Anarchists of any breed.

THE QUESTION BOX.

The following question was taken from the box and read, and Mr. James Whitton was invited by the President to furnish the reply:

"Has the coloring of cheese anything to do with the state of the milk?"

Mr. Whitton.—I do not know that coloring has anything to do with the state of the milk, but milk in certain conditions has a good deal to do with the color. If you use milk that is a little sour or acid it will not take a bright color when made into cheese. Use pure, sweet unadulterated milk. If the milk is acidy you will get a fading color.

Mr Derbyshire.—The question has been well answered The milk for good, properly colored cheese needs to be in the best possible condition whether the cheese is to be white or colored.

A Voice.—Is it not a fact that if the milk is acid the cheese is likely to be a little streaky?

REPORTS OF INSTRUCTORS.

The following reports were made by the four instructors and inspectors, that of Mr. McLeod, who was absent on account of illness in his family, being read by Mr. W. J. Bissell. After reading this paper Mr. Bissell stated that Mr. McLeod was a new man on the field, having succeeded Mr. J. A. Ruddick, who had been called to a position on the staff of the Central Experimental Station:

REPORT OF INSTRUCTOR McLEOD.

Mr. President and Gentlemen: I herewith submit my report as instructor and inspector for the season of 1891. The district over which I was appointed includes the counties of Glengarry, Stormont, Dundas, Prescott, Russell, Grenville and Carleton, with parts of Leeds and Lanark. Sixty-two factories applied for inspection, and received in all sixty-three visits. My furthest east factory is St. Eugene (Maple Leaf), on the line between Ontario and Quebec, the furthest west is Gananoque Junction. It will be easy seen that to cover this d strict a great deal of travelling had to be done, with no little discomfort and a good deal of expense to the instructor.

The number of factories visited and the number of visits at each are as follows: Dunbar 1, Kendricks 1, Winchester 1, Rose & Co. No. 1, 1, Rose & Co. No. 2, 1, Rose & Co. No. 3, 1, Alexandria North 2, Alexandria South 1, Morewood Union 1, Maple Ridge 1, White Globe No. 1, 1, White Globe No. 2, 1, White Globe No. 3, 1, Cornwall Centre 1, Dixson 1, Metcalf 1, Spring Creek 1, Morrisburgh Manufacturing Co. 1, Glen Stewart 2, Glen Roy 1, Hawkesbury 1, Vankleek Hill 1, Maple Leaf 1, Lochgarry 1, Cass Bridge 1, Malakoff 1, North Gower 1, Manotick 1, Burritt's Rapids 1, Stanley 1, Fraserfield 1, North Augusta 1, Orchard Valley 1, Fairfield 1, River View 1, Pittston 1, North Williamsburg 1, Hoasic 1, Wales 1, Willows 1, Domville 1, Charleville 1, Algonquin 1, Aultsville 1, Kempville 1, Chesterville 1, Hussey 1, Rowena 2, Dundela 1, Iroquois 1, Brinston's Corners 1, Gallingertown 1, Gananoque Union 1, Gananoque Junction 1, Lorne 1, North Star 1, Bainsville 1, Glen (Allan Grove) 1, Grant's Corners 1, Edgar's Corners 1.

The total numbers of samples of milk tested was 2,950, among which I found 35 short of cream, and 40 adulterated with water—seventy-five in all. Twelve of the above samples were found on a wet morning. In forty-five factories, I found the milk all good, 16 being more or less tampered with. The plan adopted to punish parties sending not pure milk was to give them the option of paying into the factory a certain sum as damages, or going before a magistrate to answer the charge, and in nearly every case they chose the former. Fifteen of the factories which I visited were models of cleanliness, ten were positively filthy, two were simply disgraceful, while the balance were not any cleaner than they should be. There are a few model factories in this district a credit to the owners. One of the latest models is the Willow factory owned and managed by the Messrs. Bissell, of Brockville; this building as a cheese factory is second to none in Canada.

I think it would be a great help to inspection if this Association would procure a Babcock milk test (say 20 bottle test) for each of the inspectors, as our present system is not reliable with sour samples.

LANCASTER, January 5th, 1892.

W. McLEOD.

REPORT OF INSPECTOR ROLLINS.

COBOURG, January, 1892.

I now take pleasure in submitting to you my third report as instructor and milk inspector for the western division of the Eastern Dairymen's Association. My section, this season, consisted of the counties of Frontenac, Lennox and Addington, Prince Edward and part of Hastings, which means a lot of driving. I inspected the milk and gave instructions in sixty-two factories, which subscribed for same $405 I am pleased to report that I find a marked improvement in the cheese, and also in the construction of the factories, more especially in Kingston section. I am pleased to report that factorymen in this old section are to the front again and hope they will still improve. Cheese-makers this season have been troubled very much with stinking, gassy curd. Now, I am sure that three-fourths of this trouble could be avoided if the people would aerate and strain their milk. It is surprising to see the number of people who do not strain their milk. Many milk their cows in the same yard all summer, and many of these yards are never cleaned and they are littered with droppings. The cows are shut up in the yards and lie down, and when raised up to be milked are covered with dirt which drops in the milk and is left there until it is delivered at the factory next day. I have seen lumps of dirt come down in the strainer as large as a hickory nut. Now I think it is criminal to send such milk to be manufactured into food for people to eat. I will give the cheese-makers who have had but limited experience a few hints which may be beneficial to them.

1. To be careful about changing their hand too often during the season.

2. To be careful at whose suggestion they make the change.

Now, I find that some of these makers during the first half of May make their cheese too dry and hard. Then some one comes along to inspect the cheese and finds fault with them, which is right. The maker asks him what is wrong with the cheese—he tells him they are too dry and hard. He wants to know the cause of and remedy for it. He may tell him he has not been using enough rennet and too much salt and has been putting on too much acid. He makes a change in these respects, when perhaps the feed and the season have made all the change that is necessary, and we find this same maker in June with a lot of soft, porous cheese. Now if cheese-makers would use enough rennet to coagulate the curd into a state fit for cutting in from 18 to 20 minutes, at from 84° to 88° Fahr, an l use not more than two pounds of salt per 1,000 pounds of milk up to the 20th May, and use discretion with regard to acid, this trouble would be avoided.

I was employed 180 days, during which time I imposed 53 fines, amounting in all to $1,196. In conclusion I would thank the president and members of the Kingston cheese board and also T. B. Carlaw for their untiring efforts in assisting to further the cheese industry and to stamp out frauds.

R. ROLLINS.

REPORT OF INSTRUCTOR PUBLOW.

Mr. President and Gentlemen: I herewith submit my report as instructor and inspector for th season of 1891. The district to which I was appointed was the same as that of last year, comprising the territory between Kingston and Ottawa west of the B. and O. Railway. The number of factories applying for instruction in this district was 100, and of this number I was able to visit and give instruction to 60, namely, Mississippi, 3 visits; Boyd's, 3; I.X.L., 3; Fairplay, 2; Drummond Centre, 2; Lombardy, 3; Riverside, 3; Salem, 3; Fermoy, 2; Lakeview, 2; Ardmore, 3; West Port, 2; Tay Bank, 2; Maberly, 1; Brookside, 2; Watson's Corners, 2; Hopetown, 2; Clear Spring, 2; Myers, 1; Philipsville, 2; Elgin Model, 3; Rockdale, 1; Maple Grove. 1; Centreville, 3; North Shore, 3; Stanleyville, 3; Singleton, 2; Clear Lake. 2; Smiths' Valley, 2; Plum Hollow, 3; Code's No. 3, 1; Rosev'lle, 1; Code's No. 2, 2; Chantry, 1; Reliable, 1; Code's No. 1, 1; Dexter, 2; Clyde, 2; Middleville, 2; Seeleys' Bay, 1; Springvale, 1; Lyndhurst, 2; Lakeview, 1; Washburn, 2; Delta, 1; Dominion, 1; Glen Elm, 2; S.L.U., 2; Fallbrook, 1; Farmer's Friend, 2; Gilroy, 1; Elb, 1; Farmersville, 1; Appleton, 1; Beckwith, 1; Lone Star, 1; Balderson's Corners, 1; Addison, 1; Model, 1.

The time allotted to this work was 128 days, of which 104 days were spent in testing milk and giving instructions; 17 days in travelling between factories, and 7 days attending court and visiting farms for the purpose of inspecting milk. The total number of milk tests made was 100; number of samples tested, 5,900. Among these I found 30 samples deficient in cream, 3 skimmed and watered, 32 containing added water, in all 65 adulterations. In 21 factories I found all good milk. The fines imposed on the above and paid into the treasuries of the different factories in which such adulterations occurred amounted to $615, the amount paid into the treasury of the Dairymen's Association was $80, making a total of $695 from fines.

The amount contributed by factory men to the Association for my services was $510 which, together with amount from fines ($80) makes a total to the Association of $590. The plan adopted to punish parties sending deteriorated milk, was to give them the option of signing a paper to the treasurer of the factory authorising him to deduct a certain amount (from $5 to $50) as damages from his milk account, or going before a magistrate to answer the charge. In most cases the fines were paid at once, but in one factory seven were summoned to appear before a magistrate. This being done, six finally acknowledged their guilt and only one was prosecuted. In that instance the party was tried and convicted, but appealed from the decision. His case was then tried before Judge McDonald of Brockville, who after hearing evidence sustained the conviction. I may state that I was not authorised to take any part of fines for the Association until late in the season; hence the small sum of $80 from that source.

I am pleased to note a marked improvement in the condition of the factories, and also in the condition in which milk is sent to the same. In many instances, however, the milk is tainted and this I attribute to cows drinking impure water, to rusty milk cans and to the whey which is taken from old tanks sunk in the ground which have never been cleaned out. I would strongly recommend that such tanks be replaced by vats, so constructed as to be easily and regularly cleaned. If this were done there would be fewer complaints of tainted milk and off flavored cheese.

In conclusion I take this opportunity of thanking all parties with whom I came in contact in the performance of duty, for their kindness and courtesy towards me. This report I have confined to the work actually done, but I shall be pleased to give further information if required.

G. G. PUBLOW.

Mr. HOARD.—One of the questions we have been grappling with in our State is: How can we get that skim milk to the patron with the greatest food value, so that his calves and pigs may retain that value unbroken? When we first started into it there was considerable blind stumbling, but we have struck it now, and many are turning out valuable skim milk to some of their patrons in several creameries, and next spring others will put in the machinery, which is of a very simple nature so that skim milk can be kept sweet for 26 hours, and the whey also. Let me endeavor to describe the mode practised. First of all, the sunken whey vat must go. It is impossible to keep whey right by it. You are all the time saying to your patrons: "Don't take home whey in the same can that you use for your milk," but with the sunken whey vat you have been practically doing as bad a thing. We elevate the whey tank. For a small amount of money you can get a small steam jet pump that will throw the whey into that tank. The whey is scalded to 160° by the force of the escape steam from the engines in our creamery, and you can do the same thing with your heaters. You suspend an ordinary sixteen quart wooden pail, and the whey is sent into the pail, with a steam pipe down the side of it, either by direct steam or exhaust, and the steam will heat it to 160° or 170°, a pail full at a time. As the pail fills the contents will flow over into the tank, and the skim milk or whey will keep sweet for two days. This may look queer to you, but it is a fact. As we heat it up to 80° or 85° we advance the ferment, but when we carry the heating process to 160° we kill the germs of ferment, and they will not take action again until two days, and by that time the patron will get it into the pig or calf. This elevated vat is cleaned every day. "But," said a cheese-maker, "we cannot afford to do it with our patrons. Why, they are just now trying to cut us down in the price of making. And how can we do more at less

money for them?" "Well," I said, "if you will make this whey of more profit to them perhaps you may reduce the provocation to cut you down in your pay." But he answered that he would not take them on trust for that. Now, what is this food product worth? By experiments made at the Wisconsin Experiment Station last year it was found that 100 lb. of sweet whey was worth 7 cents as an absolute promoter of flesh and health in calves, but sour whey was not worth anything. Did you ever consider that if a man is fat and wants to get thin he will feed acids to himself; but if he wants to fatten a calf or a pig he will feed sour whey (Laughter). The sugar in sweet whey has a food value. Take a thousand pounds of Muscovado sugar and dissolve it and feed it to your animals while it is sweet, and you will get the value of your sugar, but let it sour and there is no process known whereby you will get it back. In Iowa there are about forty creameries which during the past year have been sterilising the skim milk for patrons. The Dairy Commissioner of that State thought that next year there would be 200. In Wisconsin there are about twenty, and many others are making preparations to put in the necessary machinery, as it is very simple. You have an advantage here, as you have steam in your factories while we are still cursed with the old heater. It takes 25 cents to send a dollar's worth of wheat to England, and but 7 cents to send a dollar's worth of cheese, which means 25 to 7 in favor of cheese shipped to Liverpool. And it costs just 5 cents to get a dollar's worth of butter to Liverpool. Here is a gain in handling the product that is lost sight of by many dairymen. Regarding filled cheese, we have in Wisconsin, as in Canada, the poor among us still—poor in character and in spirit, poor in reputation, poor in conscience, and rich only in greed. Some of them have been putting filled cheese and stinking butter on the market, but I regret to say that we find that the law is imperfect for their successful prosecution. I suggested that the Dairy Commission hunt up their tricks and publish them in the Chicago and Milwaukee papers. That is what dishonest tricksters need—exposure. Did you ever turn over a big stone and let daylight into the dark places among the beetles, and saw bugs and other creeping things? (Laughter.) An old fellow in Iowa at one of our dairy meetings smote the table and said: "I tell you the Babcock tests are beating the Bible in making men honest. I have tried both. I have quoted Scripture to my patrons, and now I have the Babcock test. The Scripture ran off their backs like water on a duck, but the Babcock test brings them every time." (Laughter and applause.)

REPORT OF INSPECTOR BAILEY.

The following is a report of work done for the Association from Jan. 1 to Dec. 31, 1891:

No. of days at work, 143, divided as follows: Testing milk, 77 days; instructing, 24 days; attending trials at court, 20 days; driving from one section to another, 7 days; detained on account of rain, 3 days; attending board meetings, etc., 12 days. Total, 143 days.

No. of samples of milk tested for specific gravity, etc., 3,591; No. of samples tested with the Babcock test, 2,136. Total samples tested, 5,727.

No. of persons who paid fines during the year, 40. Amount of money received (being one-half the amount of fines collected), $231,95. Visits made to cheese factories, 200. Total amount received from factories during year, $217. Received cash from treasurer, $300. Balance due me from the Association, $171.

Highest percentage of butter fat from individual cow (Jersey) in October, 7.80 per cent. Lowest percentage of butter-fat from individual cow (common Canadian) in June, 1.70 per cent.

Lowest percentage of butter-fat from herd of cows, knowing sample to be pure and unadulterated, in June, 2.50 per cent. Highest percentage of butter-fat from herd of cows in June, received at the same factory and same time as the above low sample, 4.10 per cent.

Lowest percentage of butter-fat from herd, as coming to factory in month of October, 3.30 per cent. Highest percentage of butter-fat from herd, as coming to factory in month of October, 5.30 per cent.

After the months of May and June, I found no samples of pure milk to contain less than 3 per cent. of butter-fat; but during the first part of this season, I found milk in general to be very poor in butter-fat. During the season, although the milk in many localities was very gassy, I might state in several cases I found it my duty to return a number of cans of milk to their owners, as being unfit to manufacture into cheese for consumption. As inspector for the past three years, and observing, as I have had the opportunity to do, the unwholesome way in which milk is cared for and sent to our factories; I believe this needs the attention of inspectors and professors more than in the case of increased butter-fat percentage, or prosecuting in the cases of adulteration, which I believe are all well and good in their place; but in my opinion the dairyman of to-day is losing more year by year in the neglectful way he is supplying milk to our butter and cheese factories than from any other cause. Not only do these people injure themselves, but also every one interested in this great industry. Our cheeee-makers seem to be trying every effort to improve the quality of their manufacture for export, but not until all unite as one man can this great end be attained. I often wonder we keep up our reputation as well as we do in Europe, having so many poor factories and so much poor material to contend with.

ARTHUR BAILEY.

Mr. BAILEY added, concerning the fat test: I reduced the strength of the sulphuric acid when I found it to be too strong.

Prof. DEAN.—That is a risky thing to do.

Mr. BAILEY.—It is; but by adding the water slowly it may be done.

A VOICE.—Would not the remainder of the milk standing in the foul can be just as bad as the whey?

Mr. BAILEY.—No, not so bad. But every can that remains at the factory should be rinsed out with cold water before it leaves the factory that day.

A VOICE.—Are any factories talking of cleansing each patron's can before it is returned to him?

Mr. BAILEY.—Yes; four or five.

A VOICE.—What do they do with the whey?

Mr. BAILEY.—Feed it to the hogs at the factory. I think that is where the whey should be fed, if the hogs are fed far enough away from the factory. It is no trouble to run the whey quite a distance, so that there will be no contamination. I do not believe that whey should be drawn home in the cans at all.

A VOICE.—Don't you think there would be a good deal of work washing out the cans? The cheese-makers would be expected to make the cheese cheap and do all this extra work.

Mr. DERBYSHIRE.—You would have to get a man there for two or three hours every day.

Mr. BAILEY.—I believe that every can should be washed out at the factory, but I do think that our cheese-makers are getting cut down too close in price. Cheese makers and owners of factories should unite to place the price of making upon a good basis—not an exorbitant price, but a fair one. You bind the maker to manufacture a good article, but what are you supplying him with to make that good article? The maker has to run nearly all the risk.

Mr. DERBYSHIRE.—The makers of the cheese have already more than they can do and do well, and they have not the encouragement they should get from the patrons. The factories should be centres of education for the farmer—to teach him how to have a better cow and a better quality of milk. Very few factories are making any money to-day, however. Our farmers have not made enough money of late to warrant them going further into the cheese business. And why? To some extent because the men who most need dairy instruction are not at this and kindred gatherings. I feel that we must have some way of getting this information into school sections and educating the people into a better way of handling milk. They must be taught how to get the cow to use more material on the farm, and have that material put back on the soil in the manure. I am perfectly satisfied with the work of the instructors in the past, but we will have to remodel our districts by making them smaller. Every man who has a cow should take a dairy paper. so that he may get the necessary knowledge to use the animal to best advantage. There should be four or six meetings every year. John Jones' milk, and every other patron's milk, should be put on the blackboard, and the poor fellow who gets only $16 should figure at the last. The Farmers' Institutes are doing a good work for this province. But there are only a few men on the staff of speakers at these gatherings who are able to tell the farmers what they want so far as improved dairying is concerned. There should be a practical dairyman on every staff of speakers. We must not sit still and let these apple tree men get ahead of us. (Laughter and applause.)

Mr. MACPHERSON.—Much depends upon how the whey is taken back, for habit is hard to break. I know that whey can be taken back in the cans and a first-class article of cheese be made—an article which can compete with cheese made where the whey is not brought back. The first important point is that brought out by Mr. Hoard, who gets the whey kept sweet by steam. It is waste of time to attempt to discuss the returning of whey from the factory. The practical dairymen will have their skim milk and will have their whey.

A Voice.—They need it.

Mr. Macpherson.—This question of returning the whey to raise calves is a most important one. We should look closely at the results of the system. Generally speaking there are not enough calves raised in this province, nor have we enough cows. Our factories would receive a greater supply of milk were more whey and skim milk fed back to calves. We should estimate our dairy returns on the per acre plan rather than as we now do per cow. It does not matter to me whether I get 4,000 pound of milk from two cows or from one cow.

A Voice.—But there are two animals to handle.

Mr. Macpherson.—You can buy two cows for $20 that will give you 2,000 pound of milk each ; while one cow that will give you 4,000 pound will cost $50. That high-priced cow may turn out to be an inferior animal, or some accident may happen to her that will reduce her to the level of an ordinary cow. On the other hand the cheaper cow by proper handling may be made to give more milk. An average of 800 or 900 pound of milk per acre will not pay any dairyman, but if he can get 3,000 pound per acre he has a good prospect. Let us improve the quality of the whey so as to encourage dairymen to raise more cattle. I have fed 43 calves this year on whey mainly, with a little oil cake and shorts, and to-day they have no equal in the country. They weigh from 400 to 450 each. Calves should be from three to four weeks old before they get whey or warm milk and they will prosper, but if put upon cold milk too soon they will get stunted at the start and will be undersized all summer. This whey can be sterilised in the process of elevation. I have an injector which will raise the whey to a temperature of nearly 170°. I have thrown it 300 feet this year with a jet pump.

Mr. Rollins.—We have two tanks in some places in the Brockville district,—one underground and one overhead.

A Voice.—Will this jet pump hoist the whey to the overhead tank as fast as you can get it off by the siphon ?

Mr. Macpherson.—It all depends upon the capacity of the injector.

A Voice.—How many pounds of whey should a patron get back from 100 pounds of milk ?

Mr. Macpherson.—About 80 pounds.

Mr. Derbyshire.—Say 75 pounds, and give your neighbor a chance. (Laughter)

Mr. Hoard.—Show us, Mr. Macpherson, how to get rid of the deleterious effects of the whey. It has been corruptly debauched and has lost its first estate, and the last state of that whey is worse than the first. It is the decomposition of the whey that affects the can. Heat the whey to 160°, and you put a stop to the fermentation which injures the can.

Mr. Macpherson.—I spoke of the difficulty of raising calves in a good growing condition for the dairy. It does not do to fatten a calf for the dairy, for that class of calf should not be raised in a flesh condition, but in that condition favorable for growth, vigor and development. Seeing that it was necessary to encourage this, I tried an experiment with feeding sweet whey. I found that in six months I was able to feed a calf at an average cost of $5 outside of the whey. You can raise calves cheaply and in splendid condition by feeding them mainly on whey. My system was as follows : When the calf was taken from the cow the change from the warm milk was gradual. After a little while the whey was substituted for the milk. A little oil cake was ground fine and mixed with the whey, and as the calf grew I increased this to a pound a day. After a couple of weeks feeding, shorts were added. The heated whey was fed fresh every day. With the treatment I have outlined the calves grew splendidly.

THE PAST AND PRESENT OF DAIRYING.

The Province of Ontario, with a population of 2,114,475, possesses about 800,000 milch cows, 817 cheese factories, and 39 butter factories. If we allow $30 as the average value of a milch cow, $30 as the average value of the land producing pasture and other crops for the sustenance of these cows, allow a proportionate share of the farm buildings and implements to be credited to the dairy account, and to these add a fair valuation of the factories and equipment and all the buildings and apparatus used in handling the dairy produce of Ontario, we shall find that the capital invested in this business amounts to between $175,000,000 and $200,000,000.

800,000 cows at $30	$24,000,000
Land in pasture and under crop for same	90,000,000
Factories, dairies, storerooms, etc	3,000,000
Share of farm buildings	50,000,000
" machinery, implements, etc	8,000,000
	$175,000,000

The milk annually produced may be roughly divided as follows:

For direct consumption by man and beast	70,000,000 gals.
For the manufacture of butter	180,000,000 "
" " cheese	85,000,000 "
	335,000,000 "

The dairy product as finally disposed of is about as follows:

80,000,000 lb. cheese	$8,000,000
60,000,000 lb. butter	9,000,000
70,000,000 gals milk	10,000,000
Skim-milk, buttermilk, and whey	8,000,000
Total annual value	$35,000,000

Let us now glance at the export dairy trade of Canada and the United States. The following statement refers to the year ending June 30th, 1890:

DOMESTIC EXPORTS.

	Canada.	United States.
Export of dairy articles	$9,712,343	$13,081,856
Export of agricultural products	35,442,500	629,785,917
Total exports	85,257,586	845,293,828

Out of the total domestic exports the agricultural products form 41.6 per cent. in Canada and 74.5 per cent. in the United States, but the dairy exports are 27.4 per cent. of the total agricultural exports in Canada and only 2.1 per cent. in the United States. Or we may put it thus, the total United States exports are about ten times those of Canada, whereas the dairy exports are only about one-third larger.

It will thus be seen what an important part the dairy produce of Canada forms in the commercial life of this country, and how opportune to recall the past development and to discuss the present position and prospects of this great industry in connection with our province and our Dominion. The earliest record that I have found of dairying in Ontario carried out somewhat extensively is contained in the following letter which is to be found in Robert Gourlay's Statistics of Upper Canada, Vol. I. The district will be recognised as that adjacent to Long Point, Norfolk county. I reproduce the letter in full, as it will no doubt be found to be interesting.

The following letter, written to me by a person who once farmed in England, and is now a magistrate and landholder in Upper Canada, may not be without interest to some readers :

WALSINGHAM, Dec. 9th, 1817.

SIR,—Inclosed you have the report of Bayham, Middleton and Howton, which are correct. Please pardon me for troubling you with the following account, any part of which you may think worth notice you are at liberty to publish in England. I rented a farm of 240 acres of land in the north riding of Yorkshire, sold my stock and farming utensils, which was all the fortune I had, amounting to about 500 guineas. I concluded this small sum would go a little way in providing for my family in any business that I could take hold of in that country. I consulted my friend General Hale what was best for me to do. He advised me to come to Canada, and gave me a letter to Governor Simcoe. I immediately approved of his plan, and left England in 1793 with my wife and eight children; landed at Philadelphia late in the summer; spent my time in New York until June, 1794. I could not get a passage early in the spring on account of an embargo. I arrived at Niagara on the 28th of July, 1794, and was kindly received by the Governor. By this time I had spent the principal part of the money I had brought with me; for out of 500 I had left upward of 300 guineas in notes, to be collected by a relation who was in business, but was shortly bankrupt after I left England, and I never received a shilling. By this time I became acquainted with the late Hon. Robert Hamilton, to whom I made my situation known, who instantly became my warm friend and supporter. From him I rented a farm for seven years, for which I paid him $100 per annum. He lent me money to buy twenty cows, which cost $500. I had but one dollar left when I began farming; my meat, grain for bread, seed for the land, farm utensils, etc., were all procured by me on a promise of payment in September, which amounted to about $500. I began making cheese the 1st of May, 1795, which succeeded beyond my expectation. I seldom had in my dairy room any cheese that was more than three months old; sold all I made for seven years at ¼ dol. per lb., except one ton which I sold in 1802 for ½ dol. per lb. The field is still open, the price and market as good as ever. A dairy of twenty cows, well attended, will make the following amount, viz. :

Cheese through the summer season	$1,200
Loose butter throughout the year	100
Twenty calves reared to the last of November	100
Fifteen pigs fed with whey	150
Total profit one year	$1,550

Grass fed beef here far exceeds our expectation the first sight we have of this country, but cattle will fat as well and tallow better than in many parts of England. This I was assured by some of my countrymen. I did not credit the report. Determined to know by experience, I turned two lean oxen into a small field two acres and a half, the 10th day of April; they had no other pasture or feed of any kind; they were killed the last day of November. The four quarters of the first weighed 820 lb. and had 125 lb. tallow; the four quarters of the second weighed 785 lb. and had 115 lb. tallow. I then winter fatted four wethers, which were worth in the fall four dollars per head, and they made me eighteen and a half dollars per head. Winter feeding of cattle or sheep may be practiced here with success, and will leave large profits. The principal objection to winter feeding is the want of labor. Turnips can be raised here without any manure or even plowing. Clear off new land, sow the seed the latter part of June or the beginning of July, and you get a crop of turnips without hoeing or any more trouble, and of as good a quality as I ever saw.

Sir, your most obedient servant,

JOHN BACKHOUSE.

Robt. Gourlay, Esq.

Dairy methods in Ontario have been derived to a great extent from New York State, and the influence of the neighboring district cannot be overlooked. An extract from an address delivered in 1868 before the New York State Agricultural Society by Hon. X. A. Willard supplies us with some information in regard to the beginnings of dairying in that State, 1790-1800. Mr. Willard said: "Herkimer is the oldest dairy district in America. I knew the man, in his old age, who first began cheese dairying in Herkimer. He came into the country on foot, from New England, nearly eighty years ago. He was rich in health and strength. He had eight silver shillings in his pocket, an axe upon his shoulder, and two stout arms to swing it. Nearly the whole country was then a dense forest. Brant and his Mohawks had been gone several years, but traces of their plunder and murders were fresh among the early settlers in the valley and along the river. * * * Here the sturdy young New Englander picked his land. His stout arms felled the timber over many acres. He built his log house and established a herd upon the soil. Then he took to wife a Cheshire girl, who made the first dairy cheese in the State. This man's name was Arnold. He accumulated large wealth, was of the strictest integrity, and went to his rest honored and respected."

These two pioneers, grand types of the men who laid the foundation upon which many others have built, are not to be forgotten. Such men are worthy of an important place in the history of the development of this new world. The history of dairying should be as important a part of our study as the history of any political or social movement.

From reports of farmers contained in Gourlay's volume, I find that the average price of a milch cow at that time was £5 6*s.*, of butter 1*s.* a pound, and of cheese 9*d.* a pound. The prices of butter as quoted varied from 7½*d.* to 1*s.* 3*d.*, those of cheese from 5*d.* to 1*s.* 3*d.*

As throwing further light upon the subject of early dairying and showing how different was the experience in different sections, I refer to a paragraph from Canniff's Settlement of Upper Canada, p. 222, wherein is quoted Rochefoucault's remarks derived from information given by Mr. Stuart, formerly curate of Kingston. It refers to 1795. "The cattle are not subject to contagious distempers; they are numerous without being remarkably fine. The finest oxen are procured from Connecticut at the price of seventy or eighty dollars a yoke. Cows are brought either from the State of New York, and these are the finest, or from Lower Canada; the former cost twenty and the latter fifteen dollars. These are small in size, but, in the opinion of the farmers, better milch cows, and are for this reason preferred. * * * There is no ready market at which a farmer can sell that part of his cheese and butter which is not wanted for the use of the family. Of cheese and butter, therefore, no more is made than the family need for their own consumption."

In 1810 the population of the province was about 80,000, the number of milch cows 18,445. By 1824 the population had grown to 152,000. I shall here make an extract from Col. Talbot's "Five Years' Residence in the Canadas," written in 1824. "Horned cattle in both the provinces of Canada are at least one-third smaller than those in Great Britain and Ireland, and are treated, if possible, with greater cruelty than the horses. They are never housed in the winter, and not one farmer among ten thinks of giving his milch cows a single hundred of hay during the winter of nearly five months' continuance They are seen in the severest winter, when the snow is almost deep enough to cover them skulking about the barn doors where one would think their pitiful looks and sunken sides would be sufficient to extort provender from a heart of stone. Notwithstanding the unhuman treatment which they receive during winter they are found in excellent condition soon after the return of spring, and give, I believe, nearly as much milk as the best English cows."

In 1851 the population of the province was 952,004, and the number of milch cows 296,924. It was at this time that the factory system sprang into existence in New York State, and we shall have to consider briefly the course of events to the south of us.

In 1840 New York State produced milk, butter and cheese to the value of $10,496,000, and the entire United States about $34,000,000 worth—that is, in 1840 the United States as a whole with a population of 17,063,000, had a dairy production just about equal to that of the province of Ontario in 1891, with a population of 2,114,475. Between 1840 and 1850 the export cheese trade began to assume fair proportions, and Herkimer county cheese led the way. In 1848 and 1849 American cheese to the amount of 15,000,000 pounds went to Great Britain. The middle of the century brings us to the origination of the factory system. The development of the U. S. foreign dairy trade can be readily seen in the following table, giving the total exports by decades:

Exports from United States.

——	Butter.	Cheese.
	lb.	lb.
1821-30	11,596,858	7,914,198
1831-40	9,086,536	8,247,795
1841-50	33,763,410	90,610,348
1851-60	36,338,779	78,533,783
1861-70	133,985,053	446,512,816
1871-80	152,452,885	999,924,409
1881-90	188,207,800	1,041,585,996

From this table it will be seen that the cheese trade received a great impetus about the middle of this century. Coincident with it was the introduction of the factory system which was the principal cause of this great increase. Mr. Willard thus tells the story of the change from the dairy to the factory:

"About this time the associated dairy system began to attract attention. Several factories were in operation in Oneida county, and were turning out a superior article of cheese. The system had been first inaugurated by Jesse Williams, a farmer living near Rome, in that county, and was suggested from mere accidental circumstances. Mr. Williams was an experienced and skillful cheesemaker, and at a time when the bulk of American cheese was poor. His dairy, therefore, enjoyed a high reputation, and was eagerly sought for by dealers. In the spring of 1851, one of his sons having married, entered upon farming on his own account, and the father contracted the cheese made upon both farms, at seven cents per pound, a figure considerably higher than was being offered for other dairies in that vicinity. When the contract was made known to the son, he expressed great doubt as to whether he should be able to manufacture the character of cheese that would be acceptable under the contract. He had never taken charge of the manufacture of cheese while at home, and never having given the subject that close attention which it necessarily requires, he felt that his success in coming up to the required standard would be a mere matter of chance. His father, therefore, proposed coming daily upon the farm and giving the cheese making a portion of his immediate supervision. But this would be very inconvenient, and whilst devising means to meet the difficulties, and secure the benefits of the contract, which was more than ordinarily good, the idea was suggested that the son should deliver the milk from his herd daily at the father's milk house." Thus, in 1851 the factory system was inaugurated near Rome, in Oneida county, New York State.

Taking the census reports of the Dominion of Canada, we find the following returns for the province of Ontario in the years 1861 and 1871:

Ontario.	1861.	1871.	Increase per cent.
Population	1,306,091	1,620,851	16.1
Milch Cows	451,640	638,759	41.4
Acres under crop	4,101,902	6,537,438	59.1
Acres in pasture	1,860,848	2,089,177	11.8
Pounds of butter made	26,828,264	37,623,643	40.2
Pounds of cheese, home-made	2,687,172	3,432,797	456.7
" " (323 factories)	.....	12,500,000	

The Ontario Agricultural Commission in their report of 1881, introduced the chapter on dairying by referring to a few statistics shewing the growth of the industry. I shall quote a couple of sentences: "In 1857, 1858 and 1859 the exports of cheese from Canada,—probably of a local character only to a few places in the States, the Reciprocity Treaty being then in force,—were 124 cwt., 117 cwt. and 323 cwt. respectively. In 1860, 1863 and 1864 they were 1,110 cwt., 466 cwt., and 1,138 cwt. In 1859 Canada imported 857,951 lb. of cheese, paying for it $97,998, and in 1864, 766,480 lb. weight of cheese valued at $80,532."

EXPORTS OF CANADIAN DAIRY PRODUCTS.

Year ending June 30th.	Cheese.		Butter.	
	Amount.	Value.	Amount.	Value.
	lb.	$	lb.	$
1866	974,736	123,494	10,448,789	2,094,270
1867	1,577,072	193,554	10,817,918	1,741,291
1868	6,111,482	617,943	9,956,488	1,597,728
1869	4,503,374	549,572	10,853,268	2,342,270
1870	5,827,782	674,486	12,259,887	2,353,570
1871	8,271,439	1,109,906	15,439,266	3,065,229
1872	16,424,025	1,840,284	19,068,448	3,612,679
1873	19,483,211	2,280,412	15,298,033	2,808,979
1874	24,050.982	3,523,201	12,233,046	2,620,305
1875	32,342,030	3,886,226	9,268,044	2,337,324
1876	37,885,256	4,050,008	12,392,367	2,579,431
1877	37,700,921	3,897,968	15,479,550	3,224,981
1878	39,371,139	4,121,301	13,504,117	2,474,197
1879	49,016,415	4,034,750	14,536,242	2,138,447
1880	40,368,678	3,893,366	18,535,362	3,058,069
1881	49,255,523	5,510,443	17,649,491	3,573,034
1882	50,807,049	5,500,869	15,161,839	2,936,156
1883	58,041,387	6,451,876	8,106,447	1,805,817
1884	69,755,423	7,251,989	8,075,537	1,612,481
1885	79,655,367	8,265.240	7,330,788	1,430,905
1886	78,112,927	6,754,626	4,668,741	832,455
1887	73,604,448	7,108,978	5,485,509	979,126
1888	84,173,267	8,928,242	4,415,381	798,673
1889	88,534,837	8,915,684	1,780,765	331,958
1890	94,260,187	9,372,212	1,951,585	340,131
1891	106,202,140	9,508,800	3,768,101	602,175

From this statement of exports it will at once be seen that about the year 1866 our foreign trade in cheese began to assume fair proportions; at that time the exports increased and the imports decreased. Connected with this and undoubtedly the great cause of this was the beginning of cheese-making by the factory system. In 1864 the factory system was introduced into Oxford county by Mr. Harvey Farrington of Herkimer county, New York State. In 1866 the first factory was started in Hastings county by Mr. Ketcham Graham, and at the same time the first factory in Northumberland county was started by Mr. John Wade and his son Mr. Henry Wade. During the years 1864 to 1867 there was a great development of the co-operative system of cheese making in the east and the west, and more particularly in the west.

Among the pioneers of this Association was a man whose name should not be forgotten. He did much for the dairy interests of this Continent and his high moral character should be an example for our young dairymen. I refer to Mr. Harvey Farrington. From his son, Mr. I. L. Farrington, of Norwich, and from your President, Hon. Mr. Ballantyne, I have learned the following facts. He was born in Herkimer county, N. Y., March, 1809. In 1831, he commenced making cheese from his own dairy and so continued until 1863, when he erected the first factory in Herkimer county. After running this factory for one season he removed to Norwich, Oxford county, Ontario, where in

May, 1864, he began the making of cheese on the factory system. In 1866 he erected a branch factory and in 1867 he erected two more branches. These he continued to oversee until his death in 1878. His remains were interred in Herkimer county, N. Y., and your Association placed upon record its high appreciation of his work and its loving regard for one who had ever worked upon a high and noble level. (See Dairy Report of February, 1879, pp. 133-6.)

To this same period belongs the formation of the Dairymen's Association. The report of the first meeting opens as follows: "Pursuant to public notice, an important meeting was held in the Town Hall, Ingersoll, on the 31st July and 1st August, 1867, for the purpose of organising a dairymen's association, and otherwise promoting the dairy business in the Dominion of Canada. Upwards of two hundred dairymen from various parts of the country were present, and the greatest interest was manifested in the proceedings." A constitution was adopted and officers were appointed. Mr. Chas. E. Chadwick of Ingersoll, was elected president, Mr. James Noxon of Ingersoll, secretary, and a large number of vice-presidents were appointed, including many of the men whose names have been and still are intimately associated with the development of this most important industry. The same meeting was addressed by Mr. Willard of Herkimer county. In the course of his remarks he gave some figures that serve to draw a comparison between New York State and Ontario. "The first factory was erected in 1857 by Jesse Williams of Rome, N. Y., and in nine years thereafter only twenty associations dared to try the experiment. In 1860, 17 new factories were put in operation; in 1861, 18; in 1862, 25; in 1863, 11; in 1864, 210; and at the end of 1866, we had more than 500 factories in successful operation in New York alone." In 1867 the number of factories in Ontario had increased to about 235, manufacturing 25,000,000 pounds of cheese. In 1890 there were 817 factories in operation in Ontario, and the total product was 79,364,713 pounds, valued at $7,189,957, made from 836,387,516 pounds of milk, and obtained from 304,584 cows.

The great development of Canadian cheese making may be shown by reference to an address delivered at the 1869 meeting of the Dairymen's Association. According to *The Ontario Farmer* of February, 1869, Mr. Graham is reported to have said that "There was a prejudice in England against Canadian cheese owing to a trick of some American makers who, when they had a poor article, would mark it 'Canadian.' They had shipped some of their cheese through New York with an American brand, and it had realised a higher price than that shipped through Montreal." Compare that statement with the fact that at the present time enormous quantities of United States cheese go to England yearly *via* Montreal, and it is now deemed necessary to brand it as of United States make so as not to injure Canadian goods. The average price of Canadian cheese is a little higher in Britain than that of United States cheese.

CANADIAN STATISTICS.

——	1889	1890	1891
	lb.	lb.	lb.
Total cheese imported	7,057,171	13,611,097	10,774,948
Entered for home consumption	82,240	127,556	106,385
From United States	7,032,272	13,576,593	10,743,423
Exported, not the produce of Canada	6,829,748	13,229,690	11,213,911

We thus see that since the early days of cheese exportation, the Canadian product has materially improved its status in the British market, and is to-day attracting other supplies into its remunerative channels.

In 1877 the wonderful growth of the dairy interests suggested a division by the association of the territory covered. In that year, according to legislative enactment, the Eastern Association was organised at Belleville, and the Western at Ingersoll.

From the previous statements it will be seen that four events are intimately associated, viz.: The introduction of the factory system, the decrease of cheese imports, the development of cheese exports and the formation of the Dairymen's Association. It is therefore worth remembering that the Dairymen's Association has played a most important part in the development of what some consider the most successful division of our agricultural wealth. To the men who originated that association, to the men who have directed its cause, this country owes a debt of gratitude. The least we can do is to hold them in remembrance and place their names alongside of our legislators and educators as worthy of a place in the history of Canada.

Dairying is an outcome of the agricultural development of this land, and the origin of the movement may be traced through the growth of the various agricultural societies. The first volume of the Journal and Transactions of the Board of Agriculture was published in 1856. In that report after stating that the first enactment granting aid to agricultural societies was passed in 1830, the following is found: "The Board has not at present in its possession any documents from which to compile a history of the early operations of such societies, but it is believed that one was established in the Home district as early as the year 1825, and one also in the Newcastle district and in the Midland district, each respectively, at or about the same time." There has been placed in my hands a report of the organisation of the first society in the old Newcastle district, by Mr. Walter Riddell, sr., of Cobourg, who for fifty years has been a member of the agricultural societies. Mr. Riddell has a copy of the report which I have seen. He states that the society was formed at Cramahe, May 17, 1828. The officers and directors include the names of the most prominent early settlers of that district. The first show was held at Colborne, October 19, 1828, when prizes to the amount of $77 were distributed. Cheese was entered, but no butter. The society imported stock from the United States, and had to depend solely upon subscriptions for funds. The report was sent to Kingston for publication, there being no printing press then between that place and York.

The agricultural pioneers of this country builded better than they knew—the position of the dairy industry at the present time is proof.

A word or two about the future. In 1868 Mr. Willard, in addresses delivered in New York State, and at Ingersoll, Ontario, after reviewiag the then extraordinary growth of American cheese-making, and considering the supply and demand of European markets used these words: "All these facts would seem to indicate that *there is danger of pushing cheese dairying in America beyond ordinary consumptive limits.*" The italics are his. Since then the United States have increased their exports from 446,500,000 pounds for the decade 1861-70, to a total of 1,041,500,000 pounds for the decade 1881-90; and in addition the Canadian export trade has been almost entirely developed until now it amounts to nearly 100,000,000 pounds annually; or the annual export now from North America is nearly four times what it was in 1868. We need have little fear then of overdoing the cheese exportation *providing a high standard of quality is maintained.*

Further reasons for this conclusion may be given. Britain is our principal market for exports. Taking the imports less the re-exports as the amount retained for home consumption, we have the follwing as the demand per head of the total population of the United Kingdom:

—	1886	1887	1888	1889	1890
Cheese	5.20	5.47	5.65	5.57	6.23
Butter	4.57	4.42	4.88	5.60	5.84
Margarine	2.69	3.83	3.40	3.65	3.16

In 1859 Great Britain imported 406,547 cwt. of cheese; in 1873, 1,356,728; in 1877, 1,603,719; in 1881, 1,800,288; in 1885, 1,779,118; in 1890, 2,084,373.

The yearly demand of the British market has shown a steady increase for the past six years, and at the present time amounts in round numbers to the following: cheese, 225,000,000 lb.; butter, 220,000,000 lb.; margarine, 120,000,000 lb.

Next let us look at a comparison of the exports of Canada and the United States for the past ten years:

EXPORTS OF CHEESE (DOMESTIC MANUFACTURE).

Year ending June 30.	From Canada.			From United States.		
	Amount in lb.	Value.	Per pound.	Amount in lb.	Value.	Per pound.
		$	cts.		$	cts.
1881	49,255,523	5,510,443	11.2	147,995,614	16,380,248	11.1
1882	50,807,049	5,500,868	10.8	127,989,782	14,058,975	11.0
1883	58,041,387	6,451,870	11.1	99,220,467	11,134,526	11.2
1884	69,755,423	7,251,989	10.4	112,869,575	11,663,713	10.3
1885	79,655,367	8,265,240	10.4	111,992,900	10,444,409	9.3
1886	78,112,927	6,754,626	8.7	91,877,235	7,662,145	8.3
1887	73,604,448	7,108,978	9.7	81,255,994	7,594,633	9.3
1888	84,173,267	8,928,242	10.6	88,008,458	8,736,304	9.9
1889	88,534,837	8,915,684	10.1	84,999,828	7,889,671	9.3
1890	94,260,187	9,372,212	9.9	95,376,053	8,591,042	9.0

The above table is most suggestive. Although in 1881 the United States exported 100,000,000 lb. more than did Canada, in 1890 we reached their level partly by our rise, partly by their fall. The decrease of United States exports may be explained in two ways; first, owing to the increased demand at home, due to the wonderful development of their population, especially in the cities; second, owing to the production of inferior cheese, especially "filled cheese," which has decreased the demand for their better product. The injurious effect of "filled cheese" has been noticed in England and acknowledged in the United States (see Statiscian's Report, Department of Agriculture, Washington, 1890, p. 36). For Canada there is a warning in this. If we are to hold our own, to say nothing of improving our position, we must keep this one point constantly in mind, viz.: that *the quality of our goods must be maintained and improved.* Inferior articles must seek a purchaser; superior articles are sought by purchasers.

In conclusion it may not be out of place to give as a companion table to the one just preceding, a similar statement of our butter exports upon which comment is unneccessary.

EXPORTS OF BUTTER (DOMESTIC MANUFACTURE).

Year ending June 30.	From Canada.			From United States.		
	Amount in lb.	Value.	Per pound.	Amount in lb.	Value.	Per pound.
		$	cts.		$	cts.
1881	17,649,491	3,573,034	20.2	31,560,500	6,256,024	19.8
1882	15,161,839	2,936,156	19.4	14,794,305	2,864,570	19.4
1883	8,106,447	1,805,817	22.3	12,348,641	2,290,665	18.5
1884	8,075,537	1,612,481	19.9	20,627,374	3,750,771	18 2
1885	7,330,788	1,430,905	19.5	21,683,148	3,643,646	16.8
1886	4,668,741	832,455	17.8	18,953,990	2,958,457	15.6
1887	5,485,509	979,126	17.9	12,531,171	1,983,698	15.8
1888	4,415,381	798,673	18.0	10,455,651	1,884,908	18.0
1889	1,780,765	331,958	18.6	15,504,978	2,568,765	16.5
1890	1,951,585	340,131	17.4	29,748,042	4,187,489	14.1

We have shown the magnitude and great importance of our dairy industry in North America, perhaps we can shew its development, and also that of the intellectual and social condition of the people in no better way than by contrasting the present with the past, as shewn in an advertisement taken from the *New York Gazette*, September 4 to 11, 1732, which reads as follows:

"Just arrived from Great Britain, and are to be sold on board the ship Alice and Elizabeth, Captain Pane, Commander, several likely Welch and English servant men, most of them tradesmen. Whoever inclines to purchase any of them may agree with said commander, or Mr. Thomas Noble, merchant, at Mr. Hazard's, in New York, where also is to be sold several negro girls and a negro boy, and likewise good Cheshire cheese."

RESOLUTIONS IN MEMORIAM.

The following resolution, moved by Mr. Henry Wade, seconded by Mr. D. Derbyshire, was unanimously carried:

"That this Convention here assembled deplores the death of George Morton, Esq., of Boisevain Man., widely known as a former resident of Brockville, Morton and Kingston, one of the pioneers of cheese-making on the factory system in this country, having had control of a great many patrons, and being regarded as the first cheese king of the eastern portion of our province. He was energetic and untiring in the cause of dairying, and introduced many improvements in the system of cheesemaking. Also we lament the untimely death of Ira Morgan, Esq., of Metcalfe, an ex-director of this Association, who was with us at its inception, and continued to be a useful and untiring member for many years. His death was considered almost a calamity in his native county, and nearly a thousand people gathered together to do honor to his memory."

The Convention then adjourned until the evening.

FIRST DAY—EVENING SESSION.

The Convention reassembled at 8 o'clock. At this meeting there was a large attendance. A deputation consisting of Mayor Battell, Councillors Boggs, Bickell, Spinse and Fish, and Commissioners C. C. Field, M.P.P., Minaker and Dainty was introduced, and the Mayor and Mr. Field spoke brief words of hearty welcome. The President responded in an equally cordial manner, and by special request ex-Governor Hoard entertained the visitors and the meeting with his laughable New England story, "It Wasn't a Fair Race."

HOW TO MAKE DAIRYING A SUCCESS.

Prof. H. H. Dean, of the Guelph Agricultural College, prefaced his address upon this subject by remarking that it was with no small amount of diffidence that he arose for the first time to speak to the old and experienced men of the Eastern Dairymen's Association. When out with the Travelling Dairy during the past season, the old dairymen would give me a sort of patronising glance, or pat me on the back and seem to say, "Well, you are young, and may improve." The old ladies watched me very closely, for they expected the "professor" to be a sedate looking gentleman, rather elderly, with a plug hat and long black coat and all that, but when they saw that I was a young fellow they were quite free with me. Some of them would say, "Why, I think I know about as much regarding buttermaking as any Professor. I've been in the dairy business for twenty years." And then I would say, as I say now, that we can all learn from one another. What is the object of our coming to this Convention? I frankly confess that my main object is to learn something. When a man gets to such a point that he can learn nothing I pity him,

more especially when it concerns the particular business in which he is engaged. There are several means provided by which we can learn regarding the dairy industry, and among these are the many organisations existing in this province for the spread of dairy knowledge. We heard this afternoon from Mr. James a history of the industry and what great strides the dairy business has made in Ontario. In addition to our Dairy and Creameries' Associations there is the Dairy School at Tavistock in charge of a practical cheesemaker, Mr. Bell, who had 120 students learning from him during the past season. Governor Hoard remarked this afternoon that there were many things which he would like to see experimented upon at the Wisconsin Station, but Dr. Babcock had told him that just now he had more on hand than he could fully attend to. I would like to throw out a suggestion here. We have an Experiment Station at Ottawa, under the direction of the Dominion authorities, and one at Guelph controlled by the Provincial Government. The Dominion Central Farm is specially fitted to carry on these experiments, and we at Guelph will soon be ready to do the work, too. Would it not be wise, then, for the Dairymen and Creameries' Associations to appoint a committee to map out some experimental work which they think these experiment stations should undertake, and so have some work done which would enlist the interests of all these organisations? Take, for instance, this question which is coming up to-morrow about paying for milk according to its quality. We are very anxious to have it clearly shown whether it is right and just to pay for milk according to quality for cheesemaking. I know of no man except Prof. Robertson who has demonstrated to a fact that it is right and will be right to pay for milk for cheesemaking according to its quality or per cent. of fat. This committee which I have suggested should recommend only one or two experiments, for if too much is attempted the work cannot be done carefully, and that would be worse than if not done at all.

I would like now to direct your attention to the question of how to make dairying a success. The age is eminently a practical one. Men and women expect you to be able to demonstrate what you theorise or talk about. When I was visiting the Farmers' Institutes last winter I used to talk about butter making, and the people would say, "It is all very well to *talk* about it, but can you *make* better butter than we can? Are you sure that you have told us the right way to do it?" But during this summer we had a churn and could demonstrate what we were talking about, and *show* people how to do the thing. The first thing I would lay down as necessary in order to make dairying a success is the right kind of a person to manage the business. This is the foundation of the whole dairy industry. The manager must be the right kind of a man or woman. You may put certain men upon the best farms in Ontario and get them the best cows that money can buy, but they will not be able to make dairying a success. You must have the proper man on the farm. It is often thrown out as a slur that farmers are not much, only "hayseeds," etc. Coming down on the train the other day I noticed several young men on board, and one of them sitting in front of me said, "I would not take my father's farm as a gift. If I got it I would sell it. That's what I'd do with it. There is nothing in farming." Now, we want to remove that impression from the minds of young men. We must instruct and interest young men in agricultural work, and thus get them to see that there is something in farming. The skilful and sccessful dairyman must know how to grow plants. That should be the chief study of every farmer. The elements upon which plants feed are in two places: A portion is in the soil and a portion in the air. A farmer should know what elements are in the soil, and what crops take most of these elements out of the soil; also what elements are in the air, and what plants feed largely on the air. It is by knowing this that they are able to select the most profitable crops to grow from time to time. The successful dairyman must also be a good judge of cattle, for these are the tools with which he has to work. I remember when at home a man came around to our place threshing. Before long something went wrong with the engine, and they tinkered with it all the forenoon, thus throwing ten or twelve men out of work. Next the separator went wrong, and so they fooled around for two or three days doing one day's threshing, and my father said, we will not have that man again; he has not proper machinery to thresh with. The dairyman must have the right kind of a machine in his cow, and he must also know how to handle that machine. I am not going to speak particularly of the dairy cow. I

will leave that for Governor Hoard. But I shall try and point out how you may know when you have a good cow. Well, you say, that is an easy matter. You cannot always judge a cow by the amount of milk she gives without also testing the milk. When out this summer we tested in July and August 310 samples of milk. The average was 3.9 per cent. of fat. 32 samples were below 3 per cent. and 29 were above 5 per cent. The lowest had only 1.9 per cent of fat, while the highest had 9 per cent. During September and October we tested 137 samples. The average was 4.1 per cent., the lowest 2.2 per cent. and the highest 11.2. The average of the 447 samples which we tested was 4 per cent. That is high, but I can possibly account for it in this way: In some places where we went there was considerable rivalry as to who had the best cow, and I would not be sure that in every case the proper sample was taken. We sent out instructions how to take the samples, but it is impossible for me to say how correct the samples were. Take the case of the sample which had 1.9 per cent. of fat. The owners doubtless thought they had a good cow, yet it would take nearly 50 lb. of milk to make a pound of butter.

Mr. DERBYSHIRE.—And nearly 20 lb. to a lb. of cheese.

Prof. DEAN.—I thought when I took charge of the Dairy at Guelph that it would be a good thing if we could keep a systematic record of the product of our cows so far as weight and quality of milk was concerned. I will give you our method, and while I do not think it is the best I will lay it before you for suggestions. We have the yield both weighed and tested for fat. Each cow's milk is weighed morning and evening, and the weight is recorded on ruled sheets tacked up in a convenient place. Every Monday night and Tuesday morning a sample is taken from each cow for fat determination by the Babcock process, and thus we get a very fair measure of the value of the milk for butter making as well as the quantity of milk given by the animal. Let me read you the results of one week's record of four of our cows, ending July 5th:

	Morning.	Evening.
Cow No. 13. yield	176 lb.	144 lb.
Per cent. of fat.....	4.5	3.8.
7. yield.....	95	75
Per cent. of fat.....	4.4	3.8
10. yield	190	151
Per cent of fat.....	2.7	4.1
12. yield	62	52
Per cent, of fat.....	6.4	5.9

I also find a great difference in our cows in what may be termed stick-to-it-aveness. See the following illustrations:

	lb.		lb.	Decrease lb.
Week ending July 5th, No 13.	320.	Week ending Nov. 8th, (7 mo's. after)	231	89
" " " 10.	341.	" "	246	95
" " " 9.	198.	" "	186	12

You will be surprised how often we have to turn to these records, and there is no part of my work which gives me more satisfaction, as I can tell at the end of the year just what each cow has done. Unless you both weigh the milk and test it for fat you cannot tell with certainty the real value of your cow as a dairy animal. If you have the right man and not a good cow is like a two-wheeled gig, one wheel of which is without tire or felloe and goes bumping along very uncomfortably to the driver, and a good cow and the wrong man is a worse thing still; while a poor man and a poor cow are the poorest horse and gig ever fastened together. And that is why some men are going around the country saying there is nothing profitable in dairying—the wrong team are together. But let a good man and a good cow become bent on making dairying a success and it must come.

Prof. ROBERTSON.—Have you ever known a cow in proper condition to give milk that would be as low as 1.9 per cent. of fat?

Prof. DEAN.—I went to a fair at Guelph to buy a cow for our Dairy. I selected a Jersey grade, and she was brought to our stables and milked, giving 25½ lb of milk, which contained only 1.8 per cent of butter fat. But this milk had been held in the udder for about 18 hours—a cruel thing and very injurious to the animal. The milk of the evening weighed 9 lb. and contained 10.4 per cent. of fat. Her milk became normal in about three days. I might add that the milk first taken from her by us was made into butter, but it became rancid in about two days.

Mr. BAILEY.—I had one sample which went below 1.9. and another cow in the same herd had about 4.2.

Mr. GRAHAM.—I tested one sample at my factory, and it went about two per cent.

Prof. ROBERTSON.—I feared that it might go before the country that a healthy cow could go as low as 1.9 per cent. of fat in her milk. No milk sent to a factory by a cow in a normal condition should go below 2.8. If otherwise there is something wrong with the cow, and her milk should not be taken at the factory. I have this year studied over 4,000 analyses of milk, taken carefully, and have read all the records of chemists I can lay hands on, and have not found a single authentic case where a man guarded against all risks of error where the milk went below 2.8.

Prof. DEAN.—The milk from one cow in our herd that we are now milking averages about 2.5 per cent. Now one point more. In order to make private dairying a success it is absolutely necessary to have besides what I have already named proper appliances and a proper place to keep the milk in. I have no time to go into that question this evening but during my travels this summer I have wondered how the women of this country have managed to make their butter. Many of us could not make butter under the same conditions. A great many farmers will have a new reaper or mower or binder, but the women who make the butter are expected to get along with anything. Anything that is cheap seems to be good enough, like in the case of the old Dutchman who went to the railway station and asked for a ticket to Springfield. The ticket agent asked, "Springfield, Massachusetts, or Springfield, Illinois?" "Vell," responded the Dutchman, "I'll yust take the sheapest." (Laughter.) Some men will not invest sufficient money for a proper churn, and yet hope to get good prices for their butter. Private dairying will never be a success until those engaged in it have a proper place in which to keep their milk and cream—not in a cupboard or in the cellar along with the vegetables—and until the best available utensils are used in the work.

QUESTION DRAWER.

Q.—What advantage has aerated chilled milk delivered in bottles to customers over ordinary milk delivered from cans in the towns and cities?

Prof. ROBERTSON.—The only advantage is this: If milk is aerated it will be more wholesome; if it be chilled it will keep longer; if it be bottled it will be sweeter. If these three be practised, it will be an advantage.

OBSERVATIONS ON THE PROGRESS OF DAIRYING IN CANADA.

Prof. ROBERTSON, Dairy Commissioner, was called upon, when he delivered an address, of which the following is a summary:

I count it a pleasure and privilege to attend another Convention of the Dairymen's Association of Eastern Ontario. These annual gatherings are beneficial, not only from the healthful information which they bring to each one of us, but from the spirit of good fellowship and enthusiasm which they engender. I am delighted to meet our genial friend ex-Gov. Hoard, who has come again to impart to us some of his pathetic, pleasing and

potent philosophy on the dairy cow and the dairyman. Like most of us dairymen, his patriotism is not bounded by any geographical lines. With our neighbours to the south of us, we have the satisfaction of unhampered reciprocity in the exchange of the best of all products—the thoughts and good wishes of our people and theirs.

From these conventions I derive much assistance for the carrying on of the public work which has been committed to my care; and, as far as a speech of mine can be made a vehicle, a servant and a nourisher of thought, I will very willingly minister to you. Let me specify a few of the aspects of real service that come to the dairy interests of Ontario from these annual conventions. A store of information is provided for all who come and for all who will read the annual reports of your proceedings. Every member who can, ought to contribute something to the general fund of knowledge. The fund of available information of a reliable and helpful quality is sometimes more scanty than the financial resources of the Association. Then the discussions which these meetings call forth define into clearness many questions and subjects of dispute, which before were visible only through the haziness and mist of imperfect knowledge. The qualities of enthusiasm which these conventions will inspire in the breasts and evoke from the lips and hands of the dairymen will give greater confidence in the capabilities of their own business, and more hope in the future of their opportunities and country. The enjoyment of these are often the best part of a man's or a nation's capital. Among those who are actively engaged in promoting co-operative dairying, it is very important that confidence in each other should be created and maintained. Intelligent confidence can grow into a full co-operation of dairymen in Ontario, by which their concerted action can enable them to better their circumstances in every respect. The condition of the farmers on this whole continent—more so, perhaps, in the United States than here—threatens the honor and peace of the nation. Such gatherings as these will help to rescue farming from its rather discreditable condition. Farmers, as a class, are easily discouraged; and they have been discouraged beyond reason during recent years, by being assiduously directed to view their competitors with alarm, and to contemplate their waning influence on the markets with rising anger towards somebody, or something, or somehow, which is variously named "the other classes," "the other interests," "the trusts," "the combinations," "the governments," or "Providence." Now, the enlarged and improved carrying facilities of the world have made competitors out of producers who are far removed from each other by geographical location. The butter-maker in New Zealand has become next door neighbour in competition with the creamery butter-maker in Ontario. This world-wide competition is an integral part of the developments of modern civilisation. It was not brought about by the will or doing of any one mind; and the farmer, like all other men, had better adjust his practices to the new conditions, than waste his time trying to bring the old regime back. However, while he has lost control at one end of his business—while the influence of the individual on the market end of the business has been decreased—he has gained control at the other end of his business in a more than compensating measure. Increased knowledge, new appliances and improved methods have brought the cost of production more and more under his control. Profit always arises from the difference between the cost of production and the market price that may be obtained. If the latter cannot now be raised or enlarged at will, the former can be lowered and reduced by intelligent labour and management; and the profit may still be as great and may be made to depend on that safer and more controllable factor—the home-end of the business. The more time a farmer takes to attend farmers' conventions, called to discuss his own business, the more thoroughly will he be equipped to enlarge his profit in the manner which I have indicated. Many men voice their unwisdom in saying that they had no time to attend conventions. How would a farmer be rated who said he had no time to plough or cultivate his soil? For successful agriculture, the mind, as well as the field, needs to be stirred up to receive seed, in order that its harvest may be matured and reaped. If you will go back through all the materials, processes and products that are coming in excellent quality from any farm, you will find behind these things, as an essential to their economical production, somebody's clear thinking and somebody's good management. The agency whereby the farmer is enabled to exercise these functions—clear thinking and skilful and economical management—is his own mind. The harrowing up in a meeting with his fellows will

kill multitudes of weeds and provide for the growth of remunerative crops. A workman who is thoughtless enough to labour with dull tools, works at a great disadvantage. It pays a carpenter to take time to sharpen his chisels and to grind his axe.

Our methods of farming in many districts of Canada have not been conducive to profit or improvement of the lands. We have been ambitious to sell primitive products in large quantities. It would pay us better to direct our attention to the production and sale of more concentrated articles of produce, in the form of animals and their products. The following chart will illustrate the comparative exhaustion of soil from the sale of one ton each of the different farm products which are mentioned:

NITROGEN, PHOSPHORIC ACID AND POTASH IN ONE TON EACH.

	Nitrogen.	Phosphoric Acid.	Potash.
	lb.	lb.	lb.
Wheat	41.6	15.8	10.4
Barley	32	15.4	9
Oats	38.4	12.4	8.8
Peas	70.6	17.2	19.6
Beans	81.6	23.8	26.2
Indian Corn	32	11.8	7.4
Hay	31	8.2	26.4
Clover	39.4	11.2	36.8
Potatoes	6.8	3.2	11.4
Fat cattle (alive)	50	31.2	2.8
Fat sheep (alive)	44	22.6	2.8
Fat swine (alive)	34.8	14.6	2
Cheese	90	23	5
Milk	10.2	3.4	3
Fine butter	.5	...	...

By way of helping and inducing the farmers to turn their attention more and more to this line of agriculture, it was determined upon by the Government last year to establish a number of experimental dairy stations. The object of these was to investigate methods of manufacturing cheese and butter, in order that the quality might be improved, the quantity increased, and the cost reduced. Every active experimental investigation has a two-fold power of service. It may find out something which was not before known, and it may illustrate and demonstrate the best way of carrying on the best known practice. The making of cheese during the summer has absorbed the attention of dairymen in many districts to the exclusion of all thought concerning the economical raising of stock for fattening, and the production of butter of a quality fit for export to foreign markets. With the growth of fodder corn and the use of silos, it has become possible for farmers in most districts to carry and feed many more cattle than they have helpers to milk, in the shape of milking cows. If they can be induced to combine the raising of cattle to fatten, with their dairying operations, their profits may be largely increased. The raising of stock and the making of butter go well together in ordinary farm practice. The making of butter can be carried on with most profit during the fall and winter months, when prices are high and the weather offers the most suitable conditions. That season of the year in our climate also affords the best conditions for the raising of the best stock. Hence the experimental dairy stations are making an effort to induce the patrons of cheese factories to furnish milk for the manufacturing of butter during the winter in co-operative creameries. By that means the skim milk will be left or sent to the farms for the raising of such stock as calves and pigs. At Mount Elgin, Ont., and Woodstock, Ont., two of these experimental dairy stations are being operated during the present winter with very great satisfaction to the patrons in these neighborhoods. Every cheese-maker, who so wishes, is welcome to go to these stations and learn all he can about the art of butter-making, in order to fit himself for carrying on this business in his own cheese factory when the alteration there also comes. A special bulletin or report, setting forth the

results of the winter's operations, will be issued during the spring or summer, in good time for the guidance of those dairymen who desire to adapt and alter their cheese factories for the carrying on of winter butter-making.

The remainder of Prof. Robertson's address was a statement of the progress that has been made in the development of dairying in the different provinces of the Dominion. He referred to the Province of Nova Scotia, and spoke of the adaptation of its many fertile valleys for an extension of cheese-making and butter-making, combined with stock-raising. Eleven new cheese factories were started during the season of '91. Experimental investigations in the manufacture of cheese were carried on by one of his assistants at Antigonish, N.S. A quantity of the cheese so manufactured has been shipped to England to demonstrate the feasability of developing the export trade in cheese from the Maritime Provinces with Great Britain. The farmers of the Maritime Provinces have been slow to believe in the suitabilty of their soil and climate for the growth of fodder corn for cheap fall and winter feeding Over 500 sample bags of fooder corn were distributed at meetings which were held, and a number of very satisfactory and favorable reports have already been received. The Condensed Milk Factory at Truro, N.S., is giving good satisfaction to its patrons, and has the reputation of being a most profitable and prosperous concern. The demand in England for condensed milk is continually growing, and an extension of this branch of dairying was recommended.

By the Minas Basin and on the fertile valleys through which the tortuous Gaspereaux creeps sluggishly, there should be extensive and intensive dairying. In the Cornwallis and Annapolis valleys fruit-growing and dairying can be combined with advantage to both industries.

In New Brunswick a travelling instructor visited all the cheese factories at different times during the season. A quantity of cheese was also taken from this province as an experimental shipment to the English market; and during the present winter we have a travelling dairy visiting the several agricultural districts of that province. At the meetings which are held a practical illustration and demonstration in the best methods of making butter at home dairies is given.

On Prince Edward Island during last season there was only one cheese factory in operation. The natural conditions of that "Garden of the Gulf" fit it for a very prosperous and large business in animal husbandry. It is our intention to open an experimental dairy station there in the summer of '92. The milk from 350 cows has already been promised in support. The object will be to direct attention to the best methods of manufacturing cheese during the summer and butter during the winter. The growth of fodder corn on this island during last season has inspired the farmers with new hope in the prospect of feeding cattle economically.

In the Province of Quebec every county was visited by our travelling instructors; and the quality of the cheese from that part of Canada has been very greatly improved during the last two years. Some work of experimental investigation was carried on at the cheese factory at Dunham, Quebec. The milk in the eastern townships and in other parts of Quebec seems to be richer in fat constituents and also in flavor than that in the more level portions of the Dominion. At the Dominion Dairy Show, which was held at Sherbrooke, Que., cheese made in the Province of Quebec came into competition with the product of some of the best factories in Ontario. The Quebec cheese carried off the Dominion sweepstakes. On the whole, the display of cheese on that occasion at Sherbrooke was the best in quality which I have ever examined. The magnitude of the cheese trade of Canada is hardly appreciated as yet by even the dairymen of the country. During the shipping season from Montreal there were handled there some 4,500 carloads of cheese. A further improvement in its quality to the extent of fetching even a cent a pound more in the same market at the same time, is quite within the reach of the dairymen of the country. We may yet add a million of dollars a year to the income of Canadians from abroad by improvement in the quality of our cheese, although even the quantity be not increased.

In the Province of Ontario our travelling instructors were able to help some 127 cheese-makers to a better understanding of their work and business during the six weeks which were spent in visiting the different factories before the principal work of experi-

mental investigation was taken up. Each of the instructors was furnished with a Babcock milk tester, in order to give lessons to cheese-makers in the use of that most admirable and efficient testing apparatus. Then, during the summer, experimental investigations in the manufacture of cheese were conducted with a great deal of care at Perth, Ont., and at Geary's factory, London, Ont Examinations were made into such matters as the ripening of milk for cheese-making, different setting temperatures, quantities of rennet, cooking temperatures, treatment of curd after the drawing of the whey, quantities of salt, hooping the curd at different stages, and the use of milk containing different percentages of butter fat. Full information on this point will be found in the annual report of the Dairy Commissioner, which may be obtained on application to me at Ottawa. Reference has already been made to the establishment of butter-making at the stations at Mount Elgin and Woodstock, Ont.

In the Province of Manitoba the assistants of the Dairy Commissioner held some fifty meetings before harvest time. At many of the meetings they gave an illustration of the best methods of manufacturing butter. A quantity of injured or frozen wheat has been received at the Central Experimental Farm at Ottawa. Investigations are presently being conducted to determine its value for the feeding of cattle and the fattening of swine. By this means we hope to help our fellow-citizens who have made their homes in the great fertile plains of the west to multiply their sources of revenue by increasing their herds of cattle and extending their dairying operations. They will thus be fortified against the disaster which is liable to overtake farmers in a country like that, who depend entirely upon one crop.

In the Province of British Columbia a number of meetings were held during the summer in the Okanagan Valley, in the Fraser River Valley and at Victoria on Vancouver Island, all for the purpose of giving instruction and advice on the best methods of carrying on dairy farming.

From this brief and hurried survey of the field it will be seen that dairying in Canada is making considerable progress, and that no effort is being spared to disseminate information of the best sort among the farmers in every part of this vast Dominion.

The Convention then adjourned until the following morning.

SECOND DAY—MORNING SESSION.

An increased attendance was observable at this session of the Convention.

PAYING FOR CREAMERY MILK ACCORDING TO QUALITY.

Ex-Governor Hoard open the discussion on the question of the fat test and its practical bearing on the dairy business: The subject this morning, as I understand it, is the question of aiding the patrons of creameries and factories to apportion their dividends according to the relative value of their milk, let us say by the Babcock test. The Babcock test seems to take the lead, and therefore without any invidious distinctions we will make that the basis. But let me say a few preliminary words to lead up to this quest It has long been surmised that there was a great difference in the value of milk of different herds, and a few chemical analyses made at different times have shown it to be a fact. But people have gone along burdened with a knowledge of that fact, but with no relief from any invention or instrument which would render the test of practical use. Then came the oil test by Prof. Short, and subsequently Prof. Babcock invented a system of oil and acid test which is to-day not only practicable and easy and quick to work, but it is accurate—more accurate than the churn. I will talk this morning upon the fat test in creamery work, and Prof. Robertson will follow along the same line from the stand-point in cheese-making. We have the Babcock system in use at Fort Atkinson. My son and I have two cheese factories and four creameries. We have 100 patrons at the home creamery.

That creamery was started in 1887, and we have taken every day as best we could a test with the Short or Babcock apparatus—a test of every man's milk—but we never apportioned the dividends until last April. We became convinced that we were unwittingly doing a great injustice to a large number of our patrons. It was as Uncle Bill Fleming said of his chimney : " Uncle Bill, that chimney is not plumb." He backed off and eying it critically, said : " Why, it's more that plumb." (Laughter). We thought that some of our patrons were more than plumb, and that we were contributing to that injustice. We got them together and began to talk the Babcock test. Many of our patrons are Germans who cannot read English, and at first they could not make anything out of this matter. It is an advantage in some instances that a man cannot read English, because some men who can read it will not, and that makes a great difference in the final account. But the patrons soon caught the idea, and with that sense of German justice which is very strong, adjusted the matter in their own minds. We said : " We must stop the old system. It is wrong, and it is of no benefit to your growth. You are not handling, or breeding or housing these cows right, because of your system, and your system is setting up a wrong standard. We want you to change it." Then there arose some kickers – fellows who were a little doubtful. We thus put the case to them : " Here are two vats, every man who desires to take his dividend according to the *quality* of his milk will have it just in this vat– the men who want actual justice will pool together in this vat, and those of you who do not want justice but the old plan can pool together in that second vat." You never saw fellows crawl out of anything as did the kickers. They became suspicious of each others' company at once. (Laughter and applause.) Some said : " How do we know that you will do this thing fair and right?' I replied : " How do you know that we will not do anything right? Have you added anything to your risk by the test that you had not before? You have trusted to our honesty in the dividend by weight and you must do it again." So we started. There was at first a certain amount of friction such as every new system produces, but it has been wearing away until now we can fairly claim that the plan is successful. You could not get the patrons of the Fort Atkinson creamery to alter this mode for any money. The highest premiums paid in our neighborhood for milk per 100 lb. in October was $1.17 and the skim milk returned, while the dividend at our factory was $1.28 Our patrons draw their own milk. The average at the factory during October ranged from $1.10 to $1.61 per 100 lb. That is due to the Babcock test. And why is it due? Because we had all the butter-fat to credit to the creamery, and every man received what he should get according to the quality of his milk. I will tell you something to show just what effect this has upon the character of our milk. I visited Iowa in November, and just before I left I went to our bookkeeper and asked her to copy off the average value of our milk for the months of April down to October for each of the five years from 1887 to 1891, and she gave me the record. We started in 1887, and in April of that year the fat value of our milk was 4.06 per cent. The value for 1888 in April was 4.08, in April 1889 it was 3.80. (You will see that the richness was going down.) In 1890 it went up a little, being 3.97 The average for April in the four years was 3.98. In April, 1891, we began to divide by the tests, and the per centage of of fat jumped from 3.98 to 4.41. The average for the four years in May was 3.81, and in 1891 it jumped to 4.07. The average for June in the four years was 3.87, but in June, 1891, it was 4.20. For July in the four years it was 3.94, and for that month in 1891 it was 4.22. In August the four years showed 4.19, while that month in 1891 had 4.43. The month of September averaged 4.36 in the four years, and in 1891 it was 4.59. In October during the four years, the average was 4.62, and in 1891 that month averaged 4.91. The gain in these months are as follows :—April .43, May .45, June .35, July .28, August .24, September .23, October .29. The average monthly gain of 1891 over the four previous years is twenty-nine and seven one thousandth, or nearly a third of a pound of butter to every 100 pounds of milk. You can take anything in feed—linseed, bran or anything else—but nothing can compare as a milk enricher to the Babcock test. (Laughter). The insurance companies say that a certain number of fires are due to moral hazard. Temptation is taken away from the patron at once. I do not care what a man brings to me, I have no prosecutions to make. I am no longer hunting after law." Every man is judged according to the deeds done in the body. If a man is

foolish enough to bring in skim milk he gets paid for what he brings. He gains nothing by putting it in the coffee. Remember the three C's that people skim for—the *cat*, the *company* and the *coffee*. I have stated that our creamery has exceeded every other creamery in our State in premium per 100 lb. by 9 to 10 cents. Something may be due to our skill in selling, but a large proportion of that success is due to the fact that the creamery now gets credit for the entire fat contents of the milk. The men are now saving and economical, for they know that not one cents' worth of the fat is going to their neighbor. Since we adopted the Babcock test there has been an uplifting among our patrons, and I believe the system is just as applicable to cheese-making as to butter-making, although I cannot say I have had any experience in that direction, but we propose to get it put in next season if we can get our patrons to agree with us, to divide the milk for cheese according to the Babcock test. In Iowa there are 150 creameries, dividing every day on this system to each man according to the character of the milk. There are about 50 in Wisconsin and from 50 to 80 in Illinois. The system is spreading with wonderful rapidity, and leading dairy supply firms say that there is a good deal of enquiry regarding test machinery. Now, there is the simple story, and I think that the story itself carries more weight than any comment I can make. There will always be friction, but it takes friction to get to heaven. The road in the other direction appears to be greased. (Laughter). Let us go onward and upward in the path of dairy knowledge. You must have in the Dominion of Canada about 80,000 patrons. How much have you done to aid the understanding of these men? We must depend largely upon the understanding of patrons. If we can move them we can go easily forward; otherwise we must move slowly. Call them together six months before the work is to begin. Put some literature in their hands, and you will begin to crystalise the opinions all around you. Men are not dishonest as a rule. About $2,000,000 are collected by virtue of integrity where $1 has to be collected by law. Patrons on the whole are honest. What they want is instruction. If you who come here and have an understanding of the dairy problem talk to any of these men, you will appear to them to be speaking in Greek. The local paper in my district had been trying to teach dairy knowledge for twenty years, and yet many did not understand the lessons until we explained it clearly on the blackboard; but when we did, they came out and joined us (with the exception of a few kickers) and have stood solid ever since. If you ask any man on your roll of patrons if he wants what he does not furnish he will say "No." You can get no man to say that he wants what his neighbour furnishes. Some might act that way, and take all they can get, but the majority want only what they furnish. The milk is turned into the receiving tank. An accurate sample is necessary. You must be careful to take a true sample of all the milk. As that milk is turned into the receiving can it is thereby thoroughly mixed. It is mixed in a most thorough manner. It is then weighed and the weight set down, and it goes into the receiving vat. Half way down in the tin gutter, down which the milk flows, is a hole punched with a carpenters' scratch-awl, and a little jar is set so that as the milk runs over that hole, enough drops into the jar to take a sample. As soon as it runs out the jar is lifted and the sample taken. We have a pipette which contains one-third of 17.6 c. centimetres of milk. We do not want the test every day, and so we had the pipette made which contained just one-third, and each man's name is on his bottle, and we take a third test of this morning's milk. The next morning we draw out another third, and on the succeeding day we have the full sample of 17.6—which gives us a square test of three days' milk, and it is all in one bottle. The sulphuric acid and centrifugal force will soon disorganise the fat.

A Voice.—Can you keep it long?

Mr. Hoard.—By using corrosive sublimate you can keep it for a month.

A Voice.—Supposing you ran a week?

Mr. Hoard.—I do not think it would do to run a week. The chances of error would be increased. It would hardly be wise to put in only one-sixth for a week. We have no gauging by the eye; the pipette calculates for itself. It would not do to mix a month's milk together, for it would be in a somewhat coagulated state, and the percentage if error would be increased.

Mr. JAMES.—Have you tried it longer than three days?

Mr. HOARD.—Yes, but evaporation will set in slightly. It is best to try not more than three days. In taking that test we are certain that three selections are safe.

Prof. DEAN.—We take an ordinary cream jar and keep it perfect for six days. At the end of four or six days we find that the composite sample of one cows milk agrees very closely with the average single sample of her milk. We put in the corrosive sublimate and screwed the lid on tightly.

Mr. HOARD.—That is a good way, but it would be too much work for us.

Prof. DEAN.—Yes, that is what I say.

Mr. HOARD.—We are now making nearly 33 per cent. more of butter from the same amount of milk compared with the old system.

A VOICE.—Upon what evidence would your factories convict parties for adulterating milk?

Mr. HOARD.—On sufficient evidence. But having adduced sufficient evidence we cannot always convict. Judge Orton said that even the Lord himself could not prognosticate what would be the conclusion of a pettit jury. The Dairy Commissioner brought up a man this summer whom he was morally certain was guilty, and he had the evidence as clear as could be, for the Babcock test is becoming a basis of conclusion in courts. Of course there is a growth in the receptivity of evidence. The courts were a little suspicious at first, but now we have a law that no man must bring milk under 3 per cent of fat to any creamery or cheese factory in the State. It ought to be 3.50. I know that would bother some fellows, but it is just as well to bother them as to have them bother someone else. A high standard will make poor milk unmerchantable. No man has a right to water or skim milk; that is a criminal act. After it has come to the factories and all the interests have been pooled it may be skimmed, for then it does not wrong anyone. But we have been able to make any number of convictions upon the showing of the Commissioner. He is expected to enforce the law and explain the test. He makes the test generally by going to the factory. In most cases the men plead guilty. Our experience in this respect is similar to yours. The court wants pretty clear evidence that it is in the hands of an expert.

Mr. PLATT HINMAN.—Your law is somewhat similar to ours, but some of our judges state that they will not be governed by the evidence of our inspectors. Would your courts take such evidence as that?

Mr. HOARD.—Our Commissioner carries a large weight of credibility in court, as he is the agent of the law.

Mr. DERBYSHIRE.—We had better pay them for what they have in their cans, and that will stop all law.

Mr. HOARD.—Have you a legal standard?

Mr. JAMES.—No.

Prof. ROBERTS.—Is not this the solution of the whole problem? That no man can distribute milk in the streets of any city, town or village without having displayed on his waggon the percentage of butter-fat in his milk? We have got where the cheese factories and dairies do not need any more law. Throw all these minor questions out of the dairy. If a man will bring me skim milk let him get skim milk pay. In order to protect good men we have now absolutely to forbid the sale of watered or skim milk. I can pay a man for the fat the milk contains, just as the man who sells me a fertiliser expects me to pay him for the amount of phosphoric acid, or potash it may contain.

Mr. HOARD.—We are on the road to the most natural solution of the question. But still the cheese factories are not paying according to the value of the milk.

Mr. JAMES.—Because the cheese men have not agreed upon it.

THE BABCOCK TESTER FOR THE CHEESE FACTORY.

Prof. ROBERTSON, Dairy Commissioner for the Dominion, was then invited to continue the discussion of the testing of milk, and the payment of milk at cheese factories according to its quality. He said: I have the honor of wearing several titles, but when I go across the line to that distinguished institution known as Cornell University I delight to wear my proudest name—"Robert's son"—(bowing to Prof. Roberts) for Prof. Roberts is called there my agricultural "dad." (Laughter and applause.) As regards the subject which has been assigned me, I would say that the effect of paying a man who sends milk to a cheese factory, solely for the number of pounds of milk which comes in his can, has been to create a feeling of suspicion in the minds of farmers, regarding the honesty of their neighbors and the fairness of the management of the factory. You can never make a foundation for a business so deep that the superstructure will not be threatened with disaster when such a feeling is allowed to prevail. It will never do to pay A for more than comes in his can, nor B for less than comes in his. If you can devise some method which will make a fair division, you will eliminate suspicion. We have never found it needful to argue with farmers as to the advantage of accepting and doing the right thing, if we could only show them *how* to do it and how it should be done. As soon as you can show the farmer how to pay for milk according to its value at cheese factories and creameries, he will go with you. In making butter, it is very easy to frame an accurate basis for distributing the proceeds. The quantity of butter fat bears a somewhat constant relation to the quantity of butter which can be made from the milk. If you add to the butter-fat about one-sixth of something else, which sells at the same price as the butter-fat (although intrinsically not really worth as much), what is the result? In every six parts, five will be butter fat and one part of something inferior. Yet all these parts are selling at the price of the butter fat. That sixth or added part is largely water, yet owing to its association with excellent butter-fat it will bring an equal value with the butter-fat. You have in cheese three main constituents coming from milk—fat, casein and water. Now a certain part of the water in milk has a value. I can sell some of the water at 10 cents a pound, if I receive that price for my cheese. Water, like other things, gets acquired and accredited value by the company it is found in. For instance, I had a cheese-maker once, who was an awfully untidy fellow, and did not make fine cheese regularly. I bore with his infirmities, and now he is a good cheese-maker. The last time I visited his factory it was as clean as his wife's parlor. He got married to a good, smart, tidy woman, and since that time from being much in her good company he has been improved in like manner. You will never find a consumer of cheese finding fault with the water in cheese, if it is in good company. If you have too much water for the fat or for the casein, the cheese will go off flavor. But if the water is in its right place and proportion you will have a well flavored and a merchantable cheese. The casein alone will not determine the value of the milk for cheese-making; neither will the fat; the water must be there in the proper amount. It is only when there is the proper proportion of these three, that the fat is a sufficient standard for valuation. We must be fair. I have seven or eight assistants, and there is not a man of them who would not work his finger nails off for the good of the Department. My friend Mr. Ruddick did a lot of good work at the experimental factory in Perth. Let me give you a few points in regard to his work there. Extending over a considerable period, we had cheese made from milk containing an average of 3.86 per cent. of fat. There was one large vat with two partitions put in, making three compartments. The milk from all the patrons was tested and put into three classes: rich, medium and poor. We made cheese from these three. The average for the rich milk was 3.86. In the medium compartment was put milk averaging 3 6, and in the third compartment was placed the poor milk which averaged 3.45. These are the averages for nine days in each case. That is not a wide difference, but it was as wide as we could get and fill the compartments. The process of manufacture was uniform in each case. The richest milk in the last half of July and the first week in August required an average 10.38 lb. of milk to the lb. of cheese. (The average of the Province of Ontario for that season of the year was over 11 lb. with cheese made in the same way.) The average of the middle compartment was

10.84 lb. of milk to a lb. of cheese, and the average of the third lot was 11.21 lb. In milk containing between three and four per cent. of fat, the gain in the percentage of fat becomes more important, as in this case every two tenths of a per cent of fat would give about three tenths of a pound of cheese additional per 100 lb. of milk. The average yield of cured cheese per 100 lb. of milk is indicated in the following table :

Average per cent of fat in milk,	3.86	3.60	3.45.
Yield of cheese per 100 lb. of milk.	9,63lb.	9 22lb.	8.92lb.

It appears that the richer the milk is in fat, up to four per cent. the larger is the quantity of water which can be retained with the other constituents of cheese without deterioration to its quality. In ordinary cheese-making, where you have milk containing four per cent. of fat, you have reached the maximum limit and beyond that you cannot increase the per cent. of water that will be retained in the cheese, and do not increase the value of the cheese per pound.

Near London I had Mr. Dillon carrying on a series of tests, and I say without hesitation that in looking over the whole Dominion of Canada I do not know Mr. Dillon's superior as a cheese-maker. Like other good men he has a few equals. We got a wider range of quality in the milk as to richness at this factory. From one compartment we skimmed a little on a few occasions in order to get the difference wider. We had three averages of 2.91, 3.46 and 4.13 per cent. of butter-fat in the milk respectively. Each average represents from nine to twelve tests. For the richest milk in this case, the number of pounds of milk required to yield a pound of cured cheese was 10.01 ; the average required for the medium milk was 10.67 lb. and the average for the third or compartment of poorest milk was 11.71 lb. All the cheese were made by the same man, in the same factory and according to the same system. The cheese-maker can take milk containing a low percentage of fat, and make from it a large quantity of cheese if he be a capable and clever maker. He may even in a large measure replace fat by skill, and make money from poor milk by putting skill into it. But no maker can do that successfully and honestly, with our present market conditions, when milk goes below three per cent. of fat. You obtain a large additional weight of cheese from richer milk, and thus a man who furnishes to a factory milk containing a large percentage of butter-fat is entitled to a greater share of the cheese, since more weight of cheese comes from his milk than comes from the milk of other men whose cows give poor milk. If two farms of different values are together it would not do to pool the money from the sale of them, and divide the amount evenly between the two sellers. One farmer would lose and the other would gain by the transaction. We have stored some of these cheese into the curing room at Ottawa, and will keep them until next summer. I have also sent some of each of the three kinds to the old country, and I am waiting to see if the English dealers will endorse my scale of valuation, as to the relative values of milk containing different percentages of fat. I think that the addition of each per cent. of fat to the milk between 3 and 4 per cent. will add $\frac{5}{8}$ of a cent per lb. to the value of the cheese. The butter-fat in some measure adds to the value of the other constituents of milk. Let me put it in the following manner : A farmer sending milk containing 3 per cent. of butter-fat to a factory gets so much money. Another farmer sends milk containing 4 per cent. of fat to the same factory. According to a scale which values milk for cheese-making according to its percentage of fat only, he will get one-third more money per 100 lb. of milk than the patron who furnished the 3 per cent. milk. I do not say that his milk will make one-third more cheese, but in my opinion it will have one-third more value in cheese-making when both the quantity of the cheese and its quality are considered.

In ordinary work a few things have to be guarded against in using the Babcock tester. I have come across a pipette furnished with a Babcock instrument which contained more or less than the required 17.6 c. centimetres of milk. You cannot depend upon the absolute accuracy of the pipette, unless it be warranted by a competent and reliable authority. If you test milk at a creamery, a patron should be paid for about one-tenth more butter than the weight of the actual butter-fat. In the working of the Babcock machine there will be sometimes a loss of speed in the whirler by the slipping of the

belt. The bottles require whirling to the extent of at least 5,000 revolutions in order to get a proper reading of the fat.

Mr. D. M. Macpherson.—Has the speed any effect?

Prof. Robertson.—I do not think that mere speed without enough time would give sufficient separation. There is also a good deal of difficulty in getting rid of the flocculent spots of curd. The use of the correct quantity of sulphuric acid of 1·82 sp. gr. will remove that difficulty. It is not easy to read accurately if the bottles be allowed to cool. The water should be added as hot as practicable. In connection with some prosecutions for tampering with milk by patrons of factories, I have been written to by lawyers, patrons and makers. And I have here to say that I believe there have been some prosecutions of honest men. I would rather that fifty guilty men should go unpunished, than wound an innocent man who was honest. (Applause.) It is not fair to say "We will settle with you for twenty-five dollars, or we'll prosecute you." Some men will say "I am innocent and will fight you;" but others again will say, "I am innocent, but there is my wife and family, and if I do not settle, although I am innocent, the charge will get out and it may stain or ruin my reputation." Pay for a man's milk according to its value, and eliminate all these unpleasant bickerings and prosecutions. If a man sends you good milk, pay him for it; and if he sends you poor milk, pay him for it according to its quality. Put that proposition before the farmers, and nine-tenths of your patrons will adopt it. Otherwise you put a temptation before men to send poor milk, for if a man can get the same price for milk of poor quality that another milk of richer character fetches, there is no inducement for him to improve the quality of that inferior milk.

Mr. Hoard.—And there is a strong temptation for the man who has good milk to make it as poor as the poorest milk.

Prof. Dean.—Can you advise some simple plan for paying on the fat basis at factories?

Prof. Robertson.—By the use of the Babcock tester it is easy to calculate the total quantity of fat in any patron's milk. Then the total quantity of butter in all the milk furnished during the period for which a distribution is to be made can be ascertained. The total quantity of cheese or butter may be taken; but that is not an essential factor in the final calculation. The total quantity of butter-fat represents for all purposes of distribution the total quantity of milk. Then by dividing the total amount of money to be distributed by the number of pounds of butter-fat, the value of each pound of butter-fat will be ascertained. Each patron will be entitled to the amount of money which is represented by multiplying the total number of pounds of butter fat in the milk furnished by him, by the value of the butter-fat per pound. That will provide for a simple and fair distribution of the proceeds. The milk should be tested at least twice a week. That may be done most thoroughly by putting one third of the full quantity of 17.6c.c. of milk into the test bottles every morning, and completing the test every third day.

If the dairymen keep on paying for poor milk—even if it be pure—at the price of rich milk, and then continue to pay for rich milk—also pure—at the price of poor milk, and persist in the indiscriminate pooling of rich and poor at the same price, then the poor milk will ye have with you always.

ESTIMATING BUTTER FAT BY THE BABCOCK METHOD.

Mr. Frank T. Shutt, M.A., chief chemist of the Dominion Experimental Farms, Ottawa, continued the discussion on this subject as follows: The principle which underlies the whole question of testing milk has been very fully referred to to-day—that is, the payment of money for value received. Once accept that principle, be ready to adopt any reliable and practicable method to carry it out, and you have gone a long way towards introducing the purchase of milk according to its true value. The principle is a sound one, and it is one that underlies or should underlie all business transactions. Our government recognises it when it taxes whiskey at the distillery according to the amount

of alcohol it contains. Now, for our purpose we may on this occasion leave out of consideration the constituents of milk other than fat (the casein, the water, the milk sugar and ash), and confine ourselves to a discussion of the fat. It is the amount of butter-fat that a milk contains that gives this fluid its chief value, and therefore, a knowledge of the percentage of the fat enables us to arrive at a correct and just value of the milk; and this value holds good whether the milk is intended for consumption or for the manufacture of dairy products. This being the case the question arises: Is there any cheap, quick and reliable method of ascertaining the amount of butter-fat in a given quantity of milk?

For many years it has been the custom to test milk with the lactometer and similar methods, which ascertained the weight of the milk compared with that of the same amount of water. But I could give you facts and figures that such tests, made on the basis of specific gravity, are more or less fallacious. You cannot rely upon any of these methods for obtaining the real value of milk. The specific gravity of genuine milk is more or less variable, and never indicates the amount of fat. Milk can be so doctored by skilful watering and skimming as to bring its specific gravity back to that of pure milk, so that all things considered, any method that depends upon the lactometer cannot be fully relied on to ascertain the value of a milk. Chemical processes, while extremely accurate, are not such that they can be used by farmers and dairymen; they require an acquaintance with analytical methods which is not at all general.

Of late years ready methods have been devised, all of which have one leading principle, namely, the separation of the fat by the use of sulphuric acid, or oil of vitriol. There are other processes quite as accurate as Dr. Babcock's, but his is one of the easiest to manipulate, and we therefore recommend it for your adoption. The first step towards introducing any of these methods is to inspire the confidence of the farmers, and those who have milk for sale. In the the process recommended the reliability of the system must be proven to them by actual results. Already much analytical work has been done in testing these newer methods. Let me give you some personal experience in testing milk for butter fat by the Babcock process. In this work of testing milk at the laboratories of the Experimental Farm, in June last, I took thirty-two samples of milk and analysed them in duplicate by the Babcock and gravimetric methods, the results of the latter analysis being taken for the sake of comparison as correct. The results throughout the series of experiments were uniformly close, and, as the following table will show, the limits of the variations were very small indeed:

MILKS: "MORNING," "EVENING," AND "MIXED."

No.	Percentage of fat by Babcock method.	Percentage of fat by gravimetric analysis.
1	4·4 4·4	4·54 4·56
2	3·4 3·5	3·58 3·56
3	3·6 3·5	3·72 3·76
4	4·8 4·8	4·90 4·91
5	5·8 5·9	6·04 6·07
6	3·5 3·3	3·40 3·35
7	3·4 3·5	3·60 3·62

No.	Percentage of fat by Babcock method.	Percentage of fat by gravimetric analysis.
8	3·8 3·7	3·68 3·68
9	3·8 3.9	3·87 3·88
10	4·0 4·0	4·04 4·03
11	3·3 3·3	3·32 3·33
12	3·5 3·7	3·70 3·69

The first column of this table shows that the method is reliable, and that under similar circumstances closely concordant results are obtained.

Now, the accuracy of the process can be fairly ascertained by observing how close the results by the Babcock method approach those of chemical analysis. The greatest difference between the methods on the same milk is .25 or a quarter of one per cent., and variation to this extent occurred only in two or three instances.

To sum up very briefly, from my own experimental data, I find that the Babcock test gives very accurate results. The work has always been done in duplicate, and I have never found these duplicates vary to any considerable extent; in fact, as just pointed out, they have always been within .25 per cent. of the truth. Having settled this question of accuracy of the Babcock test, I will now make a few suggestions regarding the working of the test which you may find useful in addition to the instructions that accompany the machine. The milk must be well sampled. That is a *sine qua non*. It should not be shaken up too violently, as that partially churns the milk. The proper quantity should then be taken out by means of the pipette provided for that purpose. When a number of tests are to be made I measure the milk into the bottles first, afterwards adding the requisite quantity of acid without shaking, its greater weight carrying the latter to the bottom. The bottles, now containing the milk and acid are then to be carefully shaken, not by placing the fingers on the top and upsetting, but by taking the neck of the bottle quite close to the shoulder of the bottle and giving the whole a rotatory or whirling motion while inclining the bottle slightly. This latter greatly facilitates the mixing of the acid with the milk, which must be thoroughly done before the bottle is placed in the centrifugal machine. As soon as the mixing is thoroughly accomplished the bottles should at once be placed in the tester, in order that they may lose as little as possible of the heat generated by the action of the acid on the milk, and whirled the requisite time. If the room be cold, hot water should be placed in the machine. On adding water to the test bottle care should be taken that it is *hot*. I have never found any error arise through the water being too hot, while considerable difficulty in reading the percentage of fat often ensues from the addition of water that is not hot enough.

When the final whirling is finished, I take the bottles out of the machine and stand them in their order in a vessel of hot water. The effect of the hot water is to keep the fat fluid so that it may be easily and accurately noted.

The proper strength of acid is 1.82 sp. gr. to 1·85 sp. gr. This means that it is ninety per cent. pure. The strength or purity of the acid you buy may be ascertained by an hydrometer, which indicates specific gravities. The spindle or hydrometer is carefully lowered into a cylinder containing the acid, somewhat greater in diameter than the spindle and allowed to go free. The mark on the neck of the spindle coinciding with the surface of the acid denotes the specific gravity. These instructions regarding the estimation of the strength of the acid are here given because it sometimes happens that acid must be procured from the country druggist, who is not aware of the strength of the acid he sells

and the right working of the test largely depends on the proper standard of acid being used. If the acid is over ninety per cent. you will have a good deal of difficulty in reading the percentage of fat, owing to the fat being charred. If the acid is weak there will be a quantity of curd and floating scum. I would not advise diluting a too strong sulphuric acid with water. When adding water to sulphuric acid there is a great deal of heat generated, and if the operation were not carefully done a sad accident might result. Besides, the dilution might be overstepped and the acid made too weak. The results of our experiments show that the effect of too strong acid may be successfully overcome by taking a smaller quantity of it and allowing it to stand under the milk in the test bottle some time—from ten minutes to half an hour—before mixing the two together. Thus, if the acid were ninety-eight per cent. pure instead of ninety per cent. I would use 12 cubic centimeters (not 17.6 c.c. as directed) of it and allow it to stand below the milk, before shaking, for thirty minutes. The acid has such a strong affinity for water that it will dilute itself from the water in the milk, and the fat separated by it will be clear and easily read. If on the other hand the acid is found to be too weak—say sp. gr. 1.80—more of it should be used. In such a case 20 c.c. to 25 c.c. will be found to give good results.

Mr. Hoard.—Did you ever try a calliper to assist you in reading? I have done so and have been satisfied with the reading.

Prof. Shutt.—Yes, and found it satisfactory. There is a word of caution needed just here. If you measure the fat with a pair of callipers you must be careful to read the percentage from the neck of the same bottle.

Prof. Dean.—Where do you read from?

Prof. Shutt.—I find it easiest to read from the lower edge of the curve of the fat.

The Committee then adjourned until 2 o'clock, p.m.

SECOND DAY—AFTERNOON SESSION.

The election of officers having been announced for this session, the turnout of members was great.

EFFECTS OF FOOD ON THE DAIRY COW.

Preface.

Prof. I. P. Roberts, Director of the College of Agriculture and Cornell University Experiment Station was introduced and read the following paper:

The first office of food is to sustain life, and simple animal life means that the heart must have a normal movement and that the bodily temperature must be maintained at about 102 Fahrenheit. Starting with a healthy animal and continuous normal temperature, it may slowly diminish in carcass until it is reduced to one-half of its original weight and yet remain entirely healthy If through lack of food the animal is kept in low flesh, that is with little reserved energy, it immediately begins to change its habits and shape. If it is restrained from gathering its own food and is supplied with it, it soon refrains from taking exercise; marked changes appear in several organs and these changes are transmitted to the offspring with more or less certainty. If the animal seeks its own food and can procure but a limited supply, marked physical changes of quite a different character are seen, and if the food becomes scarce, necessitating more vigorous exercise to procure sustenance, the changes in the animal increase in number and in intensity and these qualities, be they desirable or undesirable, are soon transmitted with quite as much certainty and vigor as are the specialised valuable qualities of the pure bloods. In fact many bad and undesirable qualities are more certainly transmissible

than are specialised good ones. This necessitates the utmost watchfulness to arrest any tendencies towards reversion to less improved types.

How did our domestic animals become better? What forces have produced from the wild cattle of the forests, the modern dairy cow? Which factor has had the most to do with the change? Which factor if left out is likely to work the greatest injury to the dairy? The questions I have asked imply that there is more than one factor to be studied. But which one is the foundation, the beginning, the father of them all?

Opinions of Experts.

Before entering upon a critical discussion of this subject I will quote in brief what some of the most eminent writers and investigators of the present century have said, as it may help us to get a clearer conception of our subject.

Andrew Knight attributed the variation of both animals and plants to a more abundant supply of nourishment or to a more favorable climate, than was natural to the species. Darwin says, "A more genial climate, however, is far from necessary; the kidney-bean is often injured by our spring frosts, and peaches, which require the protection of a wall have varied in England as has the orange tree in northern Italy."

Again he says, "It does not appear that a change of climate whether more or less genial, is one of the most potent causes of variability." And again, "Of all the causes which induce variability, excess of food, (over subsistence) whether or not the food be changed in nature (quality) is probably the most powerful."

Andrew Knight and Schleiden both hold the same view, more especially in reference to the inorganic elements of the food.

Hardy & Sons, (England), great raisers of seeds of all kinds, say, "It is a rule invariable with us when we desire to keep a true stock of any kind of seeds, to grow it on poor land without dung; but when we grow for quantity, we act contrary and sometimes dearly repent of it."

After many chapters of facts and reasoning, Darwin sums up as follows:—

"*Excess of nutriment is, perhaps, the most effective single exciting cause of variability.*"

Food Produces Marked Changes.

All this does not mean that there are not other causes of variation; some tending towards improvement, some towards deterioration. *I desire to call your attention specifically to the fact that in the food of the animal and plant we find the most powerful single factor for producing variation and specialised qualities and for the rapid improvement of plants and animals if we know how properly to use them.*

Improvement is simply another term for making plants and animals vary—vary for the better; and improved and increased food is not only the great factor always at hand to the farmer for producing specialised improved qualities, but it is the one which is likely to give the greatest results from the least expenditure of money.

Good and sufficient food may do great injury in the dairy as well as great good. In fact the more concentrated and the better it is the more likely it is to injure both cow and calf when in inexperienced hands. Poor and insufficient food works marvellous changes for worse even in the hands of the most skillful feeders.

Suppose some of the best specimens of our highly improved breeds of dairy cows be taken to the pine woods of the North-west, some to the sparse pastures of the plains, where it takes the grass of ten to twenty acres to maintain one animal, some to the abandoned sedge fields and mild climate of Tennessee, some to the cane brakes of the forests in western Mississippi, and there left to secure their own food, what will be the result? In all of these different environments the loss of milk production will be immediate and very great, and no amount of valuable inherited qualities can save these animals from sinking to the exact level of their food supply in a few generations.

The animal that has produced, when well fed, twelve thousand pounds of milk or four hundred pounds of butter, when fed on pine straw, cactus, sedge grass or cane brake, produces scarcely one-fourth that amount, although the climate may be equitable and milder than the one in which the larger amount was produced. Infuse each year, if you will, the best of new and improved blood, still the standard of production cannot rise above the standard of the food which the animal consumes. The quantity being scant and digestibility of the food poor, the product must be low, no matter how high the breeding or how comfortable the environment. Give these same animals abundant and suitable food and they will continue to give large quantities of milk though the climate may be more rigorous and environment not of the best.

Stable the animal in comfortable quarters and continue to feed on the cane brake and pine straw, and still there are no better results than if the animal had been allowed to run at large, often not as good.

Take native animals to the manner born and change their food to succulent roots, clover hay, oats and corn, in abundance, and immediately they increase in production, some more, some less; but all begin to specialise in some direction or other, and this improvement will show though no change of environment has taken place.

The Effect of Scientific Feeding.

Beginning with the cow of the cane brake, it is only a matter of five or six generations of scientific feeding before a good cow could be produced. It would not be wise to begin our improvement with so poor an animal if a better one could be secured, but in case poor ones were the only ones available, then by judicious feeding alone, without any admixture of blood, and without improving the climate, fair success could be attained. It would not even be necessary to make any selection in order to accomplish the end sought. That the end sought would be reached more quickly by eliminating the poorer animals is true, but it is none the less true that if the food of an entire family or species be improved, all the animals will share in the improvement though not alike.

Bakewell by food alone, so far as we are able to learn, changed the almost worthless sheep of his time into a breed which brought fabulous prices for a single season's service of the males. Bakewell had no thoroughbreds from which to draw. So far as we know he did not have a single really good animal from which to start. History informs us that England at the time Bakewell began his wonderful course of breeding, had nothing but bad sheep, and if the pictures of sheep which have been handed down to us from the last century are not caricatures, we may be certain than Bakewell had for the foundation of his then unrivalled breed, the pure genuine "scrub."

Scarcely five generations of scientifically feeding grades set all England wild on the improvement of domestic animals. True, they started out with the best animals of the country, and it is equally true that they were all mixed blooded or grade specimens. Charles and Robert Colling learned of Bakewell how to feed, and went home and gathered up the best natives or mixed blooded cattle of their neighborhood, and in a few years astonished all England with their mammoth ox and the white heifer, both of which were grades. The race horse and the trotter are quite as much the product, primarily, of improved food as are the Shorthorns, Jerseys and Holsteins.

It is true that many breeds and varieties of horses have been under domestication for so long a time that we have no accurate account of the various steps which slowly led up to the horse of our time, but the observant breeder can see on every hand the wonderful changes which are wrought, not only in one or two generations but in individual animals in their lifetime by this great factor, food.

I now have in mind four of the finest bred and most promising heifers of New York, heifers which have inherited great milking tendencies through a hundred generations and a thousand years, utterly ruined before they had reached two years of age by unscientific feeding, that is they were fed for beef and not for use in the dairy. This is only one of a hundred cases which I have observed.

My neighbor is breeding Hambletonians which as you know are a small variety of horses. He has the same foundation stock as his neighbors who are breeding the same variety, but by increased and improved food alone, with correspondingly increased exercise, he is producing an animal at least twenty per cent. larger and stronger at two years old than can his neighbors, and these animals sell for correspondingly larger prices.

Theodore Lewis, the great authority on swine breeding, at Lockport, N. Y., last December said that through partial starvation and injudicious feeding of a pair of pigs which he sent to one of his customers, the owner in a single year had starved out all the thoroughbredness which he had been ten years feeding into them. Here is another illustration of the fact that the greatest factor in improvement or deterioration is food.

A variety or sub-breed can be made in three or four generations, if rigid selection is practiced and strictly scientific feeding is adhered to from the beginning till the close of the animal's life.

Effect of Food on Individual Animals.

Five years since I purchased a three minute trotting mare. She was but two and one-half years old. I soon concluded that she was too light to go alone on the Ithaca hills and so purchased a mate for her. The double carriage being heavy I thought to enlarge my team by making the mfat, and they have been kept fat to this day. The result is I have a team which possibly could be trained up to a six minutes' gait but not more. Notwithstanding I bought trotters, I fed them according to the law of the slow going carriage team, and the food was superior to breed in fixing the characteristics of my team. And so it is not only with the calves but with the cows to nearly the same extent. Food can improve, change and ruin them according to the way it is used.

I appeal to you dairymen of Canada if you have not for the last fifty years been infusing into your dairies more or less of thoroughbred blood, while at the same time you have taken considerable pains to select the best for breeding purposes and yet only the slightest perceptible improvement has resulted. You, like we on the American side, are still milking cows which average less than three thousand pounds per cow and year; I appeal to you if there is not something wrong or undiscovered when we have for a quarter of a century been discussing from the press, the rostrum and the fireside the subject of improved dairy cows. If good blood and selection had been the great factors of improvement, we should ere this have had cows which would have given a thousand pounds of solids per year. It appears to me that we have never yet emphasised as we should the effect of food in producing specialised qualities in the diary. We have made much of this factor in the beef producing varieties of animals, learning very quickly that Shorthorns and Herefords could not be preserved in size and form without large quantities of good food.

What will the Animal do with its Food?

Suppose we take a dairy cow in full milk that has been moderately fed and increase her daily food both in quantity and quality, what will she do with it? She can only use so much for support, she has eaten far more than she needs for that purpose, and so she seeks immediately to do something with it.

If she has been injured by injudicious over-feeding in calfhood the chances are that she will not increase in milk but lay on flesh and fat. If by injudicious feeding or from want of food, she has been let to go dry earlier than she should, the extra food fed to her will have only a slight effect in arresting the tendency to go dry at the time she has usually done so. She must do something with her food; she cannot make more milk with it because the power to increase the milk production has been bred out of her or rather fed out of her, and the power to put on flesh fed into her. If we take another animal that has been properly raised and handled in heiferhood, and increase her food when in full milk, she too, will do something with the increased food and since she has never learned to make beef out of it, and although she may never have given a large

amount of milk, the chances always are that she will increase her milk product with the extra food, and when she has eaten all she can use for milk production she will refuse to eat more, and by this method we have arrived at the capacity of our cow for producing milk.

Take a mixed herd of dairy cattle and increase their food from week to week and observe carefully what each animal does with the surplus. It will be found that one will increase in quantity of milk, another in quality, another in both quantity and quality; while another will begin to fatten rapidly and still another will shed her hair and use her food to grow more; others will refuse the extra allowance while others will even tend to go dry more rapidly than if the food had been less abundant.

It will be said that the different uses to which these various animals put their food is all due to differences of breeds. In one sense this may be said to be true, but this answer is very misleading, for it is simply a bare statement of the fact of the difference of quality of the several animals without any hint whatever of how they became possessed of these qualities. So we ask again how did our breeds get their superior qualities?

They did not receive them by a change of climate, because they all originally started from inferior animals and were changed to better ones without changing their climate. Selection does nothing; it simply gives opportunities to remove some of the poorer animals, thereby permitting the improvement due to better food to go on faster than it would have done if all of the animals, good and poor, had to be lifted to the higher plane. Habit comes in and takes advantage of what food has produced, fastens it and makes it possible for the animal to transmit the added specialised qualities to the offspring. True, improved environment and humane treatment will give opportunity for the food to do its full and legitimate work. Improved environment should always be sought, but you cannot run a dairy on environment.

Accounts Must be Kept.

It is quite time that we find out exactly what the cows are doing and how they do it, and talk less of breeds and pedigrees.

The dairy has been summoned to judgment; the scales and the fat tester sit on the throne; and every cow is to be weighed in the balance and if found wanting she goes to the left and travels that broad road which leads down to death. The blue bloods of the herd book are also called to judgment, and if found wanting, they too shall go down with the plebian throng to the abbatoir. And let them think not to say within themselves "we have thoroughbreds to our fathers," for I say unto you that out of these feed bins the dairyman shall be able to raise up cows unto thoroughbredness. Behold the cleaver is laid in front of the feed troughs and where the cattle come down to drink, and every cow that bringeth not forth paying results shall be hewn down and cast into the hash-mill.

If the food of the cow plays so important a part in the final outcome of the dairy then we may well linger for a time over the question of how to feed.

Judicious Feeding.

The calf should be kept growing from the day of its birth till maturity and the two extremes of over and under feeding should be intelligently avoided. Lack of nutrition must always be distinguished from healthy growth, and healthy growth from fatness. As between over feeding and under feeding the latter is preferable. A calf over-fed until two years of age is almost certainly ruined, always injured; while a calf under-fed will have its milking qualities only slightly injured and its normal size perceptibly reduced. This in some cases may act beneficially in reducing the size of animals which are inclined to be too large, and if the after feeding is correct and the quantity of food fed liberal, no serious injury will occur, especially if the heifer is bred young and correctly fed through her entire first milking season. The skill in feeding the heifer in her two or three year old form, especially the former, will determine most certainly the character of the future

cow. It should be remembered that specialised and added qualities desired cannot be fed into the cow in one year or one generation. Just here is where there is much false reasoning and more erroneous practices. If food is so potent it is said that all we have to do is to increase the quantity and improve the quality and the problem is immediately solved; but it is never solved, in that way and only can be by a steady judicious increase of food with improvement in its quality through several, sometimes many generations; and it matters not whether we start from a poor or a good animal, the problem of permanent improvement must always be solved by a steady uniform effort and not by spasmodic attempts. No man but a dolt would start with the poorer animals when the better one could be secured at reasonable cost; he would be still more unwise if he did not preserve those animals which he deemed best. But while doing this it must be kept in mind that selection is but opportunity to secure what has already been produced. You cannot run a dairy on selection. Pedigrees are good, but they too will not run a dairy. It must be run with animals which can eat, digest and assimilate large amounts of food and economically turn it into milk solids. If the ancestors of these animals which do the profitable work of the dairy were alike efficient then so much the better. Since we have not these animals at hand in sufficient numbers for all the dairies, then we must breed them, and this is a comparatively easy task if a few simple rules are intelligently followed. And now to prove my assertion I shall speak on what I have done in the last few years in developing two varieties of dairy cattle.

Cornell University Herd.

Record of the milk yield of the entire herd of the Cornell University dairy for one year ending Dec. 1, 1891. Also the per cent. of butter fats in each cow's milk and the total amount, together with the yield of merchantable butter, allowing that one hundred and ten pounds of butter can be made from one hundred pounds of butter fats.

	lb. of milk per cow and year.	Per cent. of fat.	lb. of butter per cow and year.
Eight grade Holsteins.	8476.5	3.39	318.2
Seven grade Jerseys...	5437.0	5.27	312.86
One grade Shorthorn ..	8758.75	4.44	427.76

There were eight cows in the Holstein group, one of which was a thoroughbred and two two years old. In the Jersey group there were seven, three of which were two year olds and two thoroughbreds. The grade Shorthorn was supposed to be six years old, and her breeding was entirely unknown; she had unmistakable marks to show that there was some Shorthorn blood mixed with, probably, the common cows of the country. It must be understood that this grouping is not for the purpose of making comparisons, for the number of animals is too small and the data too limited. The object in presenting these figures is to show how the dairymen can by intelligent methods in a few years build up herds which are really superior in production to the average thoroughbreds. This is not saying that the best thoroughbreds are not better than the best grades. It is saying that the best grades may be more productive than the average thoroughbreds.

Conclusions.

Having spent many years in studying the problems of the dairy I am led to the following conclusions:

That our progress in dairy husbandry has been slow because we began at the wrong end of the subject. We have been mourning over the loss of a few "floating curds," and that was well, but is it well to let our vision be so blinded with tears at this loss as to be unable to see the amount and kind of milk the cow produces? We have worried the very life out of the cheese-maker because he let escape with the whey a pound of butter-fats per cow and year, when a tithe of the skill and thought required to prevent even a portion of this waste, if expended in the feeding of the cow would have added a

hundred pounds of butter-fats for the one lost, and that, too, at a trifling expense. Like the man sitting by the river bank so intent in gathering the straws which went floating by, that he had neither eyes to see nor hands to grasp the great bundles, a single one of which contained thousands of precious grains. For near a score of years we have been trying to improve the quality of our "goods," and have made some progress, perhaps raised the price of all cheese one-half cent per pound, but in that twenty years ninety per cent. of all cows have virtually remained at the old standard of production. Yet it would not have been half as difficult to have raised the total product of the butter-fats of these cows one hundred per cent. as to have taught the people how to *guess* at the right time of "drawing the whey."

I conclude that we have been so anxious about "getting" the English market that we have forgotten the fact that we have been feeding and milking and housing two cows to do the work of one. *We have been straining at an oil globule and swallowing two cows.*

I have come to the conclusion that it will take six McKinley bills, three earthquakes and a cyclone to make the dairymen of Canada and the United States run their dairies on anything like an economic and common sense basis. In ten years any man in Canada can have a good dairy and that too without purchasing a single pedigreed animal. If he knows how to select from the thoroughbreds he may build a better dairy and in somewhat less time. In either case five things are necessary: *A man, a shotgun, a fat tester, a correct balance and a full meal bin.*

At the conclusion of the paper Prof. Roberts added the following remarks: We are milking twice and sometimes three times daily. When a cow gives much over fifty pounds of milk a day she will be unable to increase her supply even though she may eat more food, because her udder could not contain it. We seldom raise calves by hand, as there are always some cows in the herd which do not respond to good feeding; these, as occasion requires, are used for nursing the calves. When the calf is about two weeks old, if it has been given but a small amount of the new milk, it will eat very freely of meal and hay, and it will also relish a supply of water at ninety degrees. These nurse cows often give but two or three quarts of milk a day while they are raising the calf and being fed for beef. Great pains are taken not to get the calves fat. The cows are fed between five and six o'clock in the morning at this time of year. We feed about four pounds of meal at a time, composed of a mixture of 240 pounds of bran, 200 pounds of cotton seed meal and 60 pounds of corn meal. It is spread either upon roots or ensilage. In the early fall we do not feed roots, as they should always be left to ripen for a month or two after they are harvested. Too many roots tend to looseness of the bowels, which is not desirable at any time of the year. About 40 pounds of field corn ensilage per cow, and about 12 pounds of hay constitutes the roughness. The ensilage, while a great improvement upon dry corn fodder, is not altogether satisfactory.

A Voice.—What do you think is deficient in ensilage?

Prof. Roberts.—The ensilage is injured by feeding, and it is believed that a part of the albuminoids are changed into amides. Without doubt there is a considerable loss in most silos, because of the large amount of air which is present.

Mr. Hoard.—You must put your corn in very ripe in dry seasons; your corn must be deficient in juice.

Prof. Roberts.—Yes; the ensilage is sometimes too dry for best results, but a little care in advancing the season of harvesting obviates this difficulty. I think that no one is fully satisfied with the silo; yet, as I have said, it certainly is a great improvement on the old methods. Professor Robertson said the other day that we will treat what we put into the cheese vats just as the chemist treats his materials. We will know definitely what results will follow. Just now we have to guess not only at what we put in, but guess at what will come out. I shall still stick to ensilage, however; but I hope to improve it. If we merely put corn into the silo and let it go, it is nothing but squaw farming.

QUESTION BOX.

QUESTION.—How does Mr. Hoard feed his sweet whey in order to get seven cents per 100 lb. from it?

Mr. HOARD.—I stated that in Wisconsin State it was worth seven cents per 100 lb. You may find that out by writing to Prof. Henry, of our Agricultural Experimental Station. It was worth that for feeding pigs, when fed in combination with other food.

Prof. ROBERTSON.—The value of whey is never stationary, but changes from year to year with the price of other foods. But 1,000 lb. of sweet whey will give you as much result in feeding as 100 lb. of grain.

Mr. J. B. EWING.—I claim that whey is also worth something in a sour state, but if it is worth seven cents a hundred when sweet then we are losing considerably every year. If we make cheese we must make whey, and it is therefore important that we should feed it to swine in its best form.

REPORT OF NOMINATING COMMITTEE.

The following report of the Nominating Committee was read :

COBOURG, Jan. 7, 1891.

Your Committee on Nominations beg leave to report, that after careful deliberation they have decided to recommend as follows :

For President—Platt Hinman, Grafton.
For Vice-President—Wm. Bissell, Algonquin.
For Second Vice-President—T. B. Carlaw, Warkworth.
Directors.—No. 1. E. Kidd, North Gower ; No. 2, John McTavish, Vancamp ; No. 3, Richard Murphy, Elgin ; No. 4, James Haggerty, West Huntingdon ; No. 5, B. G. Mallory, Cobourg ; No. 6, Henry Wade, Toronto.
Auditors.—W. H. Thompson, Prescott, and Morden Bird, Stirling.
All of which is respectfully submitted.

H. WADE, Chairman.
R. MURPHY.
D. VANDEWATER.

Mr. HENRY WADE said : We have been guided as much as possible by the fact that when Directors had served for some time in that capacity and had been put up to the 2nd and 1st Vice-Presidencies, they should finally be promoted to the chair. Mr. Vandewater is satisfied that Mr. Haggerty should take his place. I have great pleasure in moving that the report be adopted.

Mr. VANDEWATER seconded the motion.

Mr. WARRINGTON.—Mr. Hinman has been in this Association for many years, and therefore the argument that he should be moved up will not hold. I beg leave to move the following amendment, seconded by Robert Thompson :

That the following be President, Vice-Presidents, Directors and Auditors for year 1892 :

Wm. Eager, President.
Wm. Bissell, 1st Vice-President.
Wm. Duff, 2nd "
Directors.—Div. No. 1, E. Kidd ; No. 2, John McTavish ; No. 3, Richard Murphy ; No. 4, James Whitton ; No. 5, T. B. Carlaw, No. 6, Henry Wade.
Auditors.—Morden Bird, W. H. Thompson.

Mr. HINMAN.—I understand the mover of the amendment to say that in the past I have not been an aspirant for the position for which I have just been proposed. For President we had Mr. Graham, and after him Mr. Derbyshire. Later we had Mr. Macpherson, of Lancaster. At Peterborough three or four years ago there seemed to be a feeling that there were not new men enough coming on the Board, and there was a President put in in opposition to the nomination of the Board ; and likewise at Belleville two years ago there was a feeling got up to put another gentleman into the chair in opposition to the nomination of the Board. The Board now thinks it well to introduce a plan

of rotation, dividing the presidency and the two vice-presidencies between the three sections of east, centre and west. I believe Mr. Eager is in every way well qualified for the position, but it is not so much a matter between Mr. Eager and me as between myself and the mover.

The election was then proceeded with, and by general consent a short time was allowed for members who had not paid their dues to qualify. No objection being taken between the taking of the ballots and the counting thereof, the amendment was declared carried on the following vote : For, 73 ; against, 68. The scrutineers stated that one member had voted twice.

Mr. Eager briefly returned thanks for his re-election as President.

CANADIAN DAIRY PRODUCTS AT THE COLUMBIAN EXHIBITION.

Moved by D. Derbyshire, seconded by Mr. Carlaw, and resolved :

"That in view of the magnitude and importance of the dairy interests of Canada, and the favorable attention which has been called to the natural resources and agricultural capabilities of the Dominion through the excellence and reputation of our cheese and butter, we, the members of the Dairymen's Association of Eastern Ontario in annual convention assembled, hereby respectfully commend to the attention of the Minister of Agriculture, the desirability of instructing the Dairy Commissioner of the Dominion to take such steps as will secure a representative and creditable display of dairy products from Canada at the Columbian Exhibition or World's Fair to be held at Chicago in 1893."

FODDER CORN.

Prof. Shutt again addressed the Convention, his theme being "Fodder Corn." This address was also delivered at the meeting of the Creameries' Association held at Brockville a week later, and appears in the report of the proceedings of that body. The speaker's points were closely followed, and at the conclusion of his instructive address the following discussion took place :

Prof Roberts.—Twenty tons of manure is too much for an acre of land ; five tons is enough. I would just as soon think of putting five bushels of oats into a horse's manger at one time as twenty tons on an acre.

Mr. Vandewater.—That statement alone pays me for coming.

Prof. Roberts.—If you can get the hired man to spread the manure thin enough a little will go a long way. It is pretty difficult to spread five tons, but with twenty tons you can make it look black all over. The plants cannot use more plant food in the year than is contained in five tons of good manure.

Prof. Shutt.—Do not go away with the opinion that five tons of manure per acre is enough for every soil.

Prof. Roberts.—Yet the average soil cannot take in more than five tons. I prefer to feed my land with manure every year.

Prof. Shutt.—On clay soil you give more manure into its keeping than on light soil. You must make an intelligent study of what your land requires, and if you find it gives a better response when eight tons is put on than when you put on five tons then you get the advantage of the three tons. You must take the different sorts into consideration always. The soil in our experiment received about 150 bushels of ashes when first taken hold of by us, for it was then in very poor condition.

Prof. Roberts.—We reckon that manure is worth $3 per ton. That would be $60 for twenty tons of manure to the acre. We should teach men to get the plant food out of the soil rather than put manure on the land.

Prof. Shutt.—We cannot get all out of the soil. There must be a residuum left in the soil if we cannot take all of it, and the land must therefore have more plant food than will be taken out.

Prof. ROBERTS.—When you get as a rule 25 or 30 tons of fodder corn to an acre most of it is wood and water. I used to fill my barns with that once, but I do not do so now. One of my neighbors put 85½ per cent. of water into his silo. Now what is the use of storing water in a silo, when we have wells to draw from? And then as to planting. After many years of experiment with corn ensilage, I would as soon think of planting peach trees ten feet apart, or of planting ten bushels of wheat per acre as I would of planting a bushel of corn to the acre, and many of you Canadians are doing that.

Mr. KIDD.—I know a man in our section who used to sow four bushels per acre. I took him up to one of our meetings, and he told me afterwards that he saved enough out of the seed corn to pay his expenses to that gathering. The Hon. Horace Lewis once said that this corn was wishy-washy stuff, but after a few years he acknowledged that he was wrong. He had been sowing it too thick. And so it was with one of our farmers. He had some very good and some very green, and he put the green on the top of the silo. The cattle would eat that green stuff all day and never seemed to get enough, but when they came to the older stuff they could soon eat enough and lie down and rest.

Mr. ASHLEY.—I must say that I have not had the success in saving my corn that some of our friends seem to have experienced. Perhaps it was too much wilted before I put it in. I actually had to put on some water with a sprinkler.

Mr. BISSELL.—If you want good results you must plant silo corn like you do common Canadian corn. I plant 3½ feet apart, and in hills, for the best results.

Prof. ROBERTS.—My Canadian corn reached almost up to the Horsetooth.

Mr. VANDEWATER.—I raised corn twenty-five years ago, and sowed three bushels to the acre, and now I only put in six quarts to the acre.

REPORT OF COMMITTEE ON DAIRY UTENSILS.

This committee brought in the following report :

Your committee finds that there is on exhibition a milk can and aerator, shown by Chown, Howell & Co., Belleville ; we also find a cheese faucet exhibited by D. M. Macpherson, Lancaster, which we would recommend to the attention of factory men.

G. G. PUBLOW,
ROBT. ROLLINS,
JAMES WHITTON.

The Convention then adjourned until seven o'clock.

EVENING SESSION.

The chair was taken at seven o'clock. There was a large attendance, chiefly of cheese-makers. The following financial statement was read and adopted :

AUDITORS' REPORT.

To the President, Directors and Members of the Eastern Ontario Dairymen's Association.

GENTLEMEN,—We have examined the books and accounts of your Treasurer for the year 1891, and compared the same with the vouchers produced and find them correct.

We find a balance from last audit of	$ 455 93	
Received from membership fees	100 00	
" " fines	666 95	
" " factories fees	1,386 60	
" " government	2,000 00	
Making total receipts		$4,609 48
Paid expenses of Board for committee meetings, officers, advertising, reporting law costs, etc., etc., as per Treasurer's statement	$1,132 56	
Paid Inspectors, Bailey, $743.95 ; Rollins, $780 ; Publow, $796 ; McLeod, $537	2,856 95	
Leaving a balance of	619 97	
		$4,609 48

Of this balance $29 are in the hands of W. J. Bissell and the remainder in the hands of your treasurer.

We find by referring to their accounts a balance still due Inspector Bailey of $157.05, and Rollins $198.18.

We also find that other accounts amounting to $135.10 which came in too late for payment have been passed by the board, but not yet paid.

All of which is respectfully submitted.

J. G. Foster, W. H. Thompson. } Auditors.

Cobourg, Ont., 7th Jan. 1892.

PRACTICAL HINTS ON CHEESE-MAKING.

Mr. D. M. Macpherson, in opening the discussion on cheese-making, said that he thought that the cheese-makers attending the convention had not received proper consideration, and he trusted that this would be remedied at future gatherings. We are having keener competition from foreign makers, and a closer inspection on the part of consumers, and therefore we must be prepared to meet and overcome that competition, and give just the quality of cheese that the consumer calls for. I would like to say a few words about the difficulties experienced in cheese-making—the cause and the remedy. The main difficulty which presents itself to makers now is the condition of the milk which develops the gassy curd, and which emits a very disagreeable odor during the process of making. There is a great deal of difficulty in handling that milk from day to day, and it is a difficulty which appears to be increasing. Another drawback is the lack of flavor in cheese. And there is the difficulty of securing sufficient firmness in the curd—the firmness required for the British market. Another difficulty is the securing of richness in the curd. The cause of tainted or gassy curd in many cases is the decomposition created by bad water, and it is often developed by the milk being carried in improperly cleaned vessels, such as cans or milk pails. It is sometimes created by confining milk without allowing the oxygen of the air to come in contact with it and purify it. Prevention is better than cure. I know that it is difficult to prevent gassy curd, but if makers would insist upon patrons giving their cows pure water it would prevent much of it; and the thorough cleansing of the cans and pails should also be insisted upon. It does seem as if the longer the dairymen are in the business the less attention they appear to give to the cleansing of their cans, etc., and this neglect has a very injurious effect upon the milk. The milk should be well aired. Nothing will purify milk better and prevent gassy curd than thorough ventilation and thorough aeration—the exposing of the particles of milk as soon as it is possible after being taken from the cow. This is a most essential matter. It does not do to leave the airing for an hour after the milking; it should be done immediately after being taken from the cow. It does little good to air the milk after it is cold. Air first, and then cool it; to reverse this order means to injure the milk. So much for prevention, and now for the remedy. It is a most difficult thing to cure this disease, because the milk is actually diseased when it is in a tainted or gassy condition. The remedy is to develop an acid fermentation that will overcome the putrefactive fermentation. This foul flavor or gassy condition is caused by a putrefactive ferment, and that kind of ferment can be overcome by a lactic ferment. In all cases the tainted curd has a tendency to become a dry curd. The power of the rennet seems to be stimulated to a greater extent to force out the whey from the tainted curd, and invariably this tainted curd is dry when the whey is thrown off. Now, in making cheese there is practically only one thing removed from the milk, and only two things (in a small degree) added. The one thing taken from the milk is moisture, and this moisture, or whey, is removed to create a firmness in the cheese. The two things added are rennet and salt. What is it that controls moisture and controls lactic ferment? It is temperature. And if proper degrees of temperature are not studied and carefully looked after in the curd it will be impossible to get good results in cheese-making. The temperature must be studied from the time the milk is put into the curd until the box is removed; and if possible from the time the milk is taken from the cow until the cheese is eaten in England. The higher the temperature the more stimulus you give to

the action of the rennet to force out the moisture. The reason we do not add the rennet at a high temperature is to favor the retaining of the fat globules in the curd, so that there will be as small a loss as possible and yet retain the moisture. The rennet is put in so as to form the thickening and coagulation of the curd. I believe that where you have milk in that poor, sickly condition you will have better results at 80° or 82° than at from 82° to 90°. I believe the cheese makers of this country are setting milk at too high a temperature. Too many stir their curd too soon after cutting. The curd should remain perfectly quiet for fifteen or twenty minutes, so as to retain the butter globules. By setting at a fairly low temperature and then raising it to 98° gradually, and having a perfectly uniform temperature through all parts of the vat, the best results will accrue. If you have an acid sample of milk raise it higher; but if tainted do not raise it within one degree as high as good milk, because the whey then passes out of its own accord too much. In the spring, summer and fall have a perfectly uniform temperature. If the temperature is too low, and too much moisture is retained in the curd, the texture and firmness of the cheese will be injured. If the curd is not forming quite fast enough you can run the temperature to 98° or 99°. After allowing it to cheddar have the curd spread thin. It is a difficult matter to retain the temperature when the curd is spread over the sink. We find it an advantage to have a blanket of good, thick, twilled cotton to spread over the curd. This keeps a uniform heat throughout the whole mass, and with this uniformity of temperature you will have a uniform cheese. If the temperature is varied, you will find different kinds of curd in the cheese, and the make will lack uniformity. I find also this other important matter: That when you have the curd at a uniform condition of moisture at the stage of acidity you can go largely by the clock, for fermentation goes on pretty regularly in the same temperature. You cannot make a fine cheese unless you have the gas destroyed or overcome by the lactic ferment, and it will take a much longer time to acidify if the curd is allowed to cool or get too dry. We find with good milk that from three to three and a half hours up to grinding and then an hour afterwards for airing will give you as close a cheese as you want With a tainted curd it will take longer—perhaps half an hour or an hour longer. Feel your way, however, so far as changes are concerned. Make no sudden change in your process of making. The remedy for soft or pasty cheese is much the same as that described already. We often get pasty cheese in the fall because the cheese gets cold. But if you guard against that, and hold the temperature of your curd to a proper height, and have it sufficiently firm at the critical stage, you can make a finer cheese in November than at any other time of the year. You can then make a more silky, velvety cheese if your cheese room is of the proper temperature and kept in proper condition throughout the whole process. It is a good plan to give cheese one degree more temperature in the fall, because it is liable to lose in temperature in the manipulation of the curd. From 99° to 100° gives the best results in the fall; for the summer I prefer 98°.

Mr. McCargar.—The trouble is that the cold curd cools off too quickly in the fall, and it is difficult to retain the heat.

Mr. Macpherson.—I use more salt in the fall than in the summer. Fall cheese, as a rule, is under-salted. I gradually increase from the middle of August to November from two and a half to three and a half pounds. In putting the curd to press a temperature of 78° to 80° is best. I would not put cheese to press warm; it is a mistake to do so. And if you put it to press cold it will not press well. There is a happy medium, and you must get it before you can succeed. I find it is necessary to allow the curd to remain for considerable time after salting. I would not put it to press immediately. It is much improved by allowing it to remain for an hour.

Mr. Ruddick.—I would like to give my experience in making this summer. I tried some experiments along the line just alluded to. I took some curd and put it to press immediately after salting, perhaps five minutes, and tried some others put to press from fifteen minutes to an hour and a half after adding the salt. In most cases the cheese put to press immediately after salting scored higher points than those put to press later. Even if gassy I would put it to press right away. By going to press immediately after salting I found that I could get closer cheese.

Mr. Macpherson.—My experience is rather the other way.

A Voice.—Is the greater part of the cheese made in the Brockville district too soft?

Mr. Macpherson.—In the Belleville district the cheese made in June and July were usually too hard. They soon developed a crumbling, brittle texture. I used to look upon Belleville make as the best, but last season I found Brockville the best.

Mr. Bird.—In an experience of twenty years I do not find it beneficial to heap the curd immediately after salting. If it got harsh I let it mellow down before heaping.

Mr. Bensley.—How do you keep your curd warm? Will it not cool down?

Mr. Macpherson.—Cover it up with a blanket as I have already suggested, and it will hold the heat easily enough. Let a jet of steam go between the cover and the edges. This blanket of twilled cotton is easily washed. It is about four feet wide and the length of the curd.

A Voice.—Which is best, a curd sink or a rack in the vat?

Mr. Macpherson.—If you want to make a fine evenly colored cheese you cannot make it on linen racks. If you pile your curd on the linen the linen will indent itself into the curd, and so force an undue amount of moisture out of it. When in Scotland, a few years ago, visiting the large dairies there, I found that they were much troubled with mottled cheese after pressing. I too was puzzled at first, but at last I saw the cause, and that was piling on top of linen. I suggested a remedy to the farmers, and instead of putting the curd upon linen they placed it on a board, and they were no more troubled with mottled cheese. They found that in turning it backwards and forwards they still had a perfectly uniform curd. The great secret of uniformly colored cheese is perfect moisture and perfect temperature and no linen used in piling. If you minutely examine a white cheese you will see dark or shady spots or lines, and that is where the cheese receives the linen. That is why I recommend having curd set on the smooth tin rather than linen.

Mr. Bensley.—I have a few factories, and have no difficulty in any but one. I use the racks in every one but one, and that one gives me the mottled cheese.

Mr. Macpherson.—The tin does not prevent mottled cheese. It is the different amount of moisture and temperature. My experience is in favor of working the cheese in the vat. I would not recommend putting steam under the vat to warm the curd.

Prof. Roberts.—Is it not possible to keep these factories as warm in November as in August? What is the temperature?

Mr. Macpherson.—From 70° to 80°.

Prof. Roberts.—At what temperature do you keep your curd when the whey is drawn?

Mr. Macpherson.—I like to keep it at 96°, and we can do it with the blanket. The curd, while maturing, should never go below 95°.

Mr. H. R. Free.—In some factories there are little cleats under the tin, and the tin will sink down, and you will have to tilt your vat a good deal in order to get all the whey out of it. That whey will cause acidity of cheese, and cause it to be mottled. I have been wondering if it would not be a good thing to get a rack and put it in the vat. Something should be done to keep the curd from lying in these little pools of whey.

Mr. Macpherson.—We have a wrong idea in regard to whey. What I am afraid of is the whey in the curd. A little whey on the curd will not hurt, but too much whey in it will do injury. In a perfect cheese there is thirty-three per cent. of whey. I have left curd in the whey for three hours, and before salting it would be so acid that it would bite your tongue, and it was good cheese, although perhaps a little too firm. We make a mistake in manufacturing our spring cheese in using too little salt. I would not recommend the making of a soft cheese after the middle of May. Hot weather will come upon them in June, and such cheese will be spoilt by the excessive heat. Two pounds of salt is hardly enough. I would use two pounds from the first of May to the 15th, and increase gradually after that. And you may reduce your rennet from the 15th of May.

Mr. Bensley.—Before you can do all this you will have to get better milk than we are now getting at the average factory.

Mr. Macpherson.—The remedy for sour milk is to cut your curd very much finer, heat it very much faster, press harder, draw off the curd earlier, and have a uniform acid test of one-eighth of an inch. Always give the most attention to your fastest running vat, if you have more than one.

Mr. Warrington.—I am very much pleased to occupy the chair at this most practical session of the Convention. We have Prof. Roberts with us still, and I believe it will be said when we hear him, as it was said at Cana of Galilee, that the best wine has been kept until the last.

Prof. Roberts.—Is it not possible to heat this milk by some method so that you would have known conditions, so as to kill all bacteria and get clear of floating curd and gassy curd and all that sort of trouble?

Mr. Macpherson.—I think it is possible, but it would not be practical.

Prof. Roberts.—It seems to me that some effort should be made to bring the practice of cheese-making down to a science, like butter-making.

Mr. Warrington.—We cannot make cheese by rule of thumb. It is like the ladies making pastry. The cheese-maker must have a natural talent for his business, and work with his head as well as with his hands.

HINTS REGARDING THE SOIL AND MANURING.

Prof. Roberts, being called upon for an address, thus responded: The problem of the day is how to get the greatest product from the least amount of expenditure of energy. The time was when a boy who would not do sixteen hours of labor a day and then do the chores after that was counted a lazy fellow. The time is now here when a boy or man will prosper best who can get the most out of anything with the least labor. No man to-day thinks of doing anything the hardest way; the average man will sit down and study how to do it the easiest way. The problem is how to eliminate all the friction possible. We say that a man is foolish who does not oil his machinery and get all the possible energy out of his fuel. The woman who has not things wisely and well and economically arranged is called a poor housekeeper. Now, from whence do we get life and a living? Out of the soil; it starts from there. We are made of the earth, earthy. The right end of this problem is to learn how to feed a plant. Here, in the soil we tread, is a mine of wealth unworked. Think of it; in the average soil of Canada and the United States that will produce 25 bushels of wheat with good culture there is one-quarter of a lb. of potash in every 100 lb. of soil; one-eighth of a lb. of phosphoric acid and half a lb. of nitrogen. An acre of soil a foot deep weighs 1,600 tons, and from this I get enough nitrogen, potash, etc., etc., computed at the price of commercial fertiliser, to represent a value of $3,000 worth of plant-food. Of course this cannot all be got out of the soil. There must always be a large residuum. But all of that is not residuum, and the man who will leave all that valuable material unused in the soil is very foolish when he may get it out by culture. On our farm we have taken a piece of poor clay land and put it continually to wheat without using any kind of fertiliser and yet we have increased the yield of wheat each year. A little hard clay knob that you would say would not grow white beans was sown to cow peas. In an acre nine inches deep that soil contained 3,094 lb. of phosphoric acid, 3,410 lb. of ash, and 1,876 lb. of nitrogen. The roots left in the soil from the cow peas increased the nitrogen in the soil. I am thoroughly convinced that there are vast quantities of plant food in poor soil that we can use to advantage. How many times have you broken the clay clods? Why, year after year. But you put in a tile drain and sow in the clover, lo, a miracle is wrought! The first thing a farmer should do next spring is to drive Dobbin and his mate up to the gate of some field that is covered with plants of some sort or other. Should he destroy these plants? Not if he cannot get better ones to grow in their places. Some farmers in New York State last year plowed up good plants and raised nothing better than rag-weed. I plowed and cultivated so thoroughly after the third crop of wheat that without any fertilisers or

manures the field gave me 36 bushels to the acre. But we plowed and harrowed and cultivated and rolled and got in that plant food available in order to raise the 36 bushels of wheat per acre. We have 12½ acres which two years ago were full of blue-grass and thistles. I got a man and said: "You must plow that field five times." He said: "I have worked over that field time and again, and I never knew a man who got a clear dollar of profit out of it." We must raise wheat according to the law of wheat, and not according to the law of peas or corn. Wheat says: "I must be sown properly, I must have a deep soil plowed and replowed and then have an inch of nice mellow soil on top." I have in the bank to-day $200 for my half of the 12½ acres of winter wheat at a dollar a bushel and the straw.

A Voice.—When I was a boy I used to hear the old proverb:

"Wheat after wheat, you'll have nothing to eat;
Rye after rye, you'll have bread till you die."

Prof. Roberts.—Now, if there is anything I want to leave with you more than anything else it is that first principle of agriculture—culture of the soil. There are millions of acres that will have to go back to timber again unless we become more skilful farmers. As I rode from Toronto and looked out of the window of the car I wondered why someone did not leave a little timber to break the wind from the lake. Why did not someone say, "O, woodman, spare that tree!" Treat land liberally and it will repay you in the character of its output. Get that plant food out of its dormant state, get it out of the soil; get it into the plant and the plant into the animal, and all that is left goes back again to the land. All over this beautiful country, without phosphates, without plow, without any husbandman, wild nature raised more animals than you do now. At one time the marshes could hardly hold the ducks and geese and other fowl. How was that wonderful vegetation sustained? The refuse, the leaves, the straw, the manure, dropped in the fall on a surface where plants were growing. Now for a little while I will talk of the king of American plants—and that is corn. If you had never seen anything but the common grass or the legumes, and a man said to you, "We have a grass that grows fourteen feet high and that makes first-class bread, and the cattle and horses like it, and the chickens like it, and it gives five to six tons of dry fodder to the acre and fifty bushels of grain." You would say to yourself, "That man is a most extraordinary liar." (Laughter). And if he said "All you need to do is to put three or four seeds in hills three or four feet apart and that comes up so that soon it makes the whole field like a tiny forest," you could not believe the story. But that corn must be grown according to the law of corn. If that engine which brought me here had been run according to the law of steam boats what would the result have been? I tried to show you this morning that every breed and variety of animal had a law governing its growth, and as to how if should be fed. The law of nutrition is different in various animals, and in different breeds of the same animal. We feed a racehorse according to the law of racehorses and a beef animal according to the law of beef animals, and so we must raise corn according to the law of a corn plant. Now while you can get considerable results even when doing a thing wrong, you can get better results by doing the thing in the correct way. Now corn is a plant that requires a good deal of heat, but not necessarily a long season. Corn does better in Ohio than it does in Mississippi and Illinois. Too long a season is not good for corn. This plant uses nitrogen largely in the earlier stages of its growth, and phosphoric acid largely in making the ear. Nitrification goes on only where there is the proper amount of moisture and heat, and consequently the larger part of nitrification occurs in June, July and August. The roots of the corn plant are shallow feeders much more shallow than those of potatoes. Wheat will follow potatoes a good deal more kindly than corn, because the potato roots have not fed near the surface. There are some of the corn roots which for want of a better name we call water roots. They are thin and hard, and I have seen them ten or twelve feet long in loose land where there was water below. In dry weather the little mouths of some of these feeding roots come above the surface of the soil to get the dew. The best thing to do to-day on your heavier lands is to plow a little deeper than you have ever done before, and plow in the fall. Plow a wide furrow. Use the jointer plow.

A Voice.—What kind of corn would you sow?

Prof. ROBERTS.—We raised a variety of corn called Sibley's Pride of the North, a dent corn, and planted it on the University farm. and it did not get ripe I planted it earlier next year, and got my green corn so it would grow, though it did not get entirely ripe. I have worked with it until it is modified, the ears are shortened, and enlarged, and it gets ripe now some days before the Canadian corn. The kind of corn to raise in any locality for ensilage is the largest kind that will give a ripened ear before frost The dent corns have been raised in a warmer clime, and are more vigorous in their root growth. Do not plant early in the spring if your land is cold and wet. You should use the jointer. Thirty-five per cent. of the friction of a plow is caused by its weight, and yet you use plows that weigh 600 pounds; 30 per cent in cutting the furrow slice, and 10 per cent for turning and grinding the furrow. It is absolutely absurd to let the soil slide off the mould board without being ground. The soil wants the air and sun to penetrate through it, and the jointer plow is better adapted for this than any other plow. Do some harrowing, but do not get it down so fine as your wheat land; and do not solidify corn land by too much tramping of horses and harrowing overmuch. The proper distance to plant is 3½ feet each way. Corn well cultivated will show the effect on the land for three years after. The word manure is taken from a French word which means to cultivate with the hand. Feed the corn by culture once, by culture twice, by culture three times; then add barn manure, and then some fertiliser.

A VOICE.—What cultivator do you find the best?

Prof. ROBERTS.—Fine tooth. Cultivate close and deep. Give the corn plant organic manurial matter. Wheat likes this manurial matter without the intervention of a plant. Do not cut corn too early, as it is bitter when quite green. A well fed cow would not touch it if it is raised too thick and cut too green.

A VOICE.—That is so.

Prof. ROBERTS.—You cannot fool a cow that knows what good hay and bran is. Get the very best food. And having this best food we should feed it carefully yet liberally, and feed it, too, according to the law of the dairy, and not according to the law of the trotting horse. The professor closed his interesting address by a description of the 177,000,000 miles of corn row in the United States which the American boys had to walk up and down ten times every year. "Shorten this corn row," the speaker said in conclusion; "earn your bread by the sweat of your brow (face) and not by the blister of your heels."

VOTES OF THANKS.

Mr. DERBYSHIRE.—I may say that we feel grateful to the good people of Cobourg for their cordial reception of us, and the kind attention we have received since arriving here. This meeting will long be remembered by the Eastern Dairymen's Association. I trust the members will put into practice the many excellent hints thrown out at this annual gathering, and if so dairying in Canada will take a decided step in advance Our good friend Mr. Hinman looked after our wants and the wants of the speakers, and those with him on the local committee also deserve much praise, and I have much pleasure in moving the following resolution:

Moved by Mr. Derbyshire, seconded by Mr. Macpherson, That this Convention desires to place on record its high appreciation of Mr. P. Hinman and Mr. D. Vandewater, for the efforts which they have always put forth to promote our great dairy industry, from the inception of our work as an Association, and that this resolution be recorded in the minutes and published report of this Convention.

Mr. WARRINGTON.—The services of these two gentlemen for the past fifteen or twenty years are well known, and have always been appreciated, and I am sure you will pass this motion by acclamation.

Mr. MACPHERSON also spoke highly of the zeal and unselfishness of the subjects of the resolution in matters relating to the Association, after which the resolution was unanimously carried.

Messrs. VANDEWATER and HINMAN briefly thanked the Association, and after a resolution of thanks had been passed to the Mayor and Council of Cobourg for their cordial welcome and attention, to the press and railways, and also to the various speakers who had assisted at the meetings, the Convention closed.

II—DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

OFFICERS FOR 1892.

President, - - - - - - - - JOHN GEARY, London.

1st Vice-President, - - - - - - WILLIAM MESSER, Bluevale.

2nd Vice-President, - - - - - - A. F. MCLAREN, Stratford.

Directors.

Division No. 7.—JOHN PRAIN, Harriston.

Division No. 8.—HAROLD EAGLE, Attercliffe Station.

Division No. 9.—JOHN RIESBERRY, Bright.

Division No. 10.—WM. DICKSON, Atwood.

Division No. 11.—THOMAS BALLANTYNE, Stratford.

Division No. 12.—JOHN A. LEITCH, Glencoe.

Division No. 13.—JOHN S. PEARCE, London.

Secretary, - - - - - - C. E. CHADWICK, Ingersoll.

Treasurer, - - - - - J. C. HEGLER, Ingersoll.

Auditors, - - - - - - - JOHN ROBERTSON, Ingersoll.
C. H. SLAWSON, Ingersoll.

Representative to the Toronto Industrial Exhibition:
BENJAMIN HOPKINS, Brownsville.

Representatives to the Western Fair London:
JOHN S. PEARCE, London; JAMES CARMICHAEL, Avon.

Representatives to the Central Farmers' Institute, Toronto:
Hon. THOMAS BALLANTYNE, Stratford; JOHN A. LEITCH, Glencoe.

LIST OF MEMBERS

FOR 1892.

Name.	Post Office.
Austin, A.	Springford.
Atkinson, William	Melbourne.
Agur, E	Ingersoll.
Brown, R. W.	Fordwich.
Barkett, S.	London, box 132.
Barr, George	Culloden.
Baldwin, Walter	Dunnville.
Butchart, James	Burgessville.
Barry, T. D.	Aylmer.
Benton, John	Brantford, box 732.
Bell, A. T.	Tavistock.
Booth, G. E.	Ingersoll.
Blackmore, J. G.	Drumbo.
Ballantyne, R. M.	Stratford.
Brown, H. W.	Beaconsfield.
Beam, J. F.	Black Creek.
Brown, A. W.	Rebecca.
Ballantyne, T.	Stratford.
Ballantyne, T., jr.	Stratford.
Brown, Geo. B.	Brownsville.
Brown, E. B.	Brownsville.
Baxter, John.	Brownsville.
Brown, Calvin B.	Brownsville.
Brown, Henry	Culloden.
Barry, John H.	Culloden.
Chalmers, John W.	Poole.
Cosh, Newton	Toronto, 323 Queen St. West.
Cleland, James	Listowel.
Charlton, T. W.	St. George.
Caddey, Thomas.	Ingersoll.
Clark, James	Vienna.
Clark, Alexander.	Shakespeare.
Corless, John	Villa Nova.
Colwell, William	Drumbo
Collens, D.	St. George.
Campbell, A. T.	Brantford.
Clydesdale, I. M.	Tyneside.
Cook, George	Ingersoll.
Cook, A. L.	Corinth.
Cuthbertson, N	Tilsonburg.
Daniels, Naboth, sr.	Verschoyle.
Daniels, Naboth, jr.	Verschoyle.
Daniels, John	Mount Elgin.
Dynes James	Verschoyle.
Dawson, W.	Vittoria.
Dickson, William	Atwood.
Durst, F. W.	Sebringville.
Dunham, P.	Innerkip.
Downing, F. F	Masonville.
Dart, Samuel	London East.
Dillon, T. J.	Mount Elgin.
Dornoch, Archibald	Cotswold.
Digby, Isaac	Rothsay.
Douglass, Wm.	Teviotdale.
Davis, Samuel	Corinth.
Eagle, Harold	Attercliffe Station.
Ellis, Francis	Verschoyle.
Ellis, Walter	Wallace.
Eddy, J. B	Scotland.
Elliott, James	Tilsonburg.
Evans, J. H	Tiverton.
Elliott, W. A	Brownsville.
Fero, Walter	Eden.
Farrington, J. L.	Norwich.
Farrington, George	Norwich.
Farrington, E. H.	Franklinville, N.Y.
Foster, Thomas	London.
Fyfe, Robert	Harriston.
Fulton, John	Brownsville.
Freeman, S. A	Culloden.
Gardner, W J	Woodstock.
Gaymen, Jacob	Dunnville.
Gray, James A.	Atwood.
Gunther, E	Bismarck.
Geary, John	London, box 132.
Galloway, George	Ingersoll.
Goodhand, George	Milverton.
Green, B H	Sheffield.
Gough, R. A	Ballymote.
Gall, James	Masonville.
Huffman, Paul	Northfield Centre.
Honsberger, Daniel	Dunnville.
Hopkins, J. E.	Brantford.
Hart, J. W.	Ex. Farm, Ottawa.
Heaslip, John L., jr	Wellandport.
Harris, Herbert	Verschoyle.
Harris, James	Verschoyle.
Haskett, W. N.	London.
Hately, George	Brantford.
Healy, M. C	Eden.
High, Abraham	South Cayuga.
Hunter, E	Woodstock.
Hainer, J. H	Springvale.
Hoover, John	Springfield.
Hill, J. F.	Paris.
Hogarth, H. C	Culloden.
Humphrey, T. G	Straffordville.
Hussier, Thomas	Ballymote.
Hawkins, R. W	Brownsville.
Impett, Thomas.	London West.
Ivil, James	Cotswold.
Johnson, Robert.	Bright.
Jones, T. Lloyd	Burford.
Jackson, William	Culloden.
Johnson, E. W.	Tilsonburg.

List of Members.—*Continued.*

Name.	Post Office.	Name.	Post Office.
Kidd, Walter	Sylvan.	Richardson, John	St. George.
Kline, F. E	St. Anns.	Roy, James	Walnut.
Knopton, Thomas	Masonville.	Rennie, John	Teviotdale.
Laidlaw, Wm	Attercliffe.	Ruckle, Henry	Culloden.
Lee, S. R	Hickson.	Ruckle, D	Culloden.
Lewis, Francis	Ballymote.	Reynolds, Michael	Tilsonburg.
Leitch, J. A	Glencoe.	Ryan, Wm. M	Culloden.
Lawrence, Benjamin	Avon.	Sennabaugh, Walter	Attercliffe.
Luton, Charles	Lyons.	Steinhoff, J. W	Sebringville.
Morrison, James	Henfryn.	Smith, Edward P	Tilsonburg.
Millar, T. B.	Burgoyne.	Symington, William	Camlachie.
Miller, John F	North Bruce.	Smith, C. W	Centralia.
Miller, William	Attercliffe.	Simmons, O	Verschoyle.
Miller, James	Attercliffe.	Stevens, W. S	Ostrander.
Morrison, John	Newry.	Simmons, Warren	Dereham Centre.
Messer, William	Bluevale.	Scott, J. W	Sparta.
Morris, George	Culloden.	Smith, Reuben	Mt. Elgin.
Mann, A	Telfer.	Stratton, R. W	Straffordville.
Mallory, T. C.	Yarmouth Centre.	Schragg, C	New Hamburg.
McDermid, James	Tiverton.	Saul, Isaac	Crumlin.
McNaughton, John	Burgessville.	Sutton, F. W	Cainsville.
McTaggert, George	Seaforth.	Schrumm, Alfred	Bismarck.
McLellan, W. D	Harriston.	Stephens, William	London.
McLaren, A. F	Stratford.	Sifton, John J	Avon.
McCullough, Hugh	Avon.	Sifton, Henry	London.
McCombs, James	Kelvin.	Stanfield, William	Ballymote.
McDonald, Moses	Dereham Centre.	Scandrett, Jacob	Masonville.
Ostrander, W. A	Dutton.	Scandrett, George	London.
Ord, A. B	Ingersoll.	Stoneman, John	Avon.
Podmore, John	Ingersoll.	Slawson, C. H	Ingersoll.
Peltin, A. E	Courtice.	Scott, Robert	Fulton Mills.
Pearce, J. S	London.	Swayzie, Charles	Dunnville.
Parker, A. A	Rockford.	Scott, A. L	Tilsonburg.
Price, Lewis A	Mount Elgin.	Smith, D. T	Tilsonburg.
Powell, R. A	Ballymote.	Smith, C. E	Brownsville.
Pickard, A	St. Marys.	Sawyer, F	Box 6 Brownsville.
Prain, John	Harriston.	Swance, John	Tilsonburg.
Paterson, James	New Durham.	Truves, George	Courtland.
Paget, J. N	Canboro'.	Thompson, Walter	Rothsay.
Powell, F. A	St. Marys, box 300.	Thompson, George	Forest.
Pow, William	Mt. Elgin.	Vanlen, F. W	Springford.
Patterson, A. L	Cotswold.	Williams, J. F	Culloden.
Patterson, Alex	Harriston.	White, Henry	Belfast.
Phelps, L. L	Brownsville.	Wilford, John	Brownsville.
Rainey, A	Brantford.	Webster & Richardson	St. Marys.
Reid, James	Bright.	Watson, Richard	Ballymote.
Reid, J. H	Verschoyle.	Walker, George S	Avon.
Russell, John	Boston.	Winter, J. T	Aylmer.
Richardson, L. R	Strathroy.	Wallace, Alexander	Verschoyle.
Ritchie, J. T	Otterville.	Wood, William	Molesworth.
Roberts, John	Gobles.	Waddell, T. J	Marlett.
Ralph, James	Ballymote.	Waddell, William	Kinloss.
Robertson, John	Ingersoll.	Waldron, Thompson	Rothsay.

FIFTEENTH ANNUAL CONVENTION

OF THE

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

The fifteenth annual convention of the Dairymen's Association of Western Ontario was opened at 2 p.m., January 12th, 1892, in Wycliffe Hall, Brantford. Though held in a city admittedly outside the great dairying districts, the meeting was gratifyingly successful, not only in the dissemination of knowledge on technical matters among the practical dairymen assembled, but in calling attention to the advantages of dairying among the farmers of an important agricultural district.

FIRST DAY.

In the absence of the President, Hon. THOMAS BALLANTYNE, the First Vice-president, Mr. JOHN GEARY, of London, took the chair. He said :

GENTLEMEN,—If you will kindly come to order, we will commence the business. I am sorry to tell you that our President, Hon. Mr. Ballantyne, through illness, has not been able to get here in time for the opening of this meeting, as it was his intention to do. However, he will be here in the course of the afternoon. It devolves upon me, as First Vice-president, to open the twenty-fourth annual meeting of the Dairymen's Association of Canada and the fifteenth annual meeting of the Western Dairymen's Association. I cannot impress too strongly upon the gentlemen who attend these meetings the necessity of helping along the Association with their membership fees. While the convention is free to all, we hope that every person who comes may become so much interested in the Association that he will become a member. The membership fee is $1 per year, for which you get the reports of the three Associations—the Eastern Dairymen's Association, the Western Dairymen's Association, and the Creameries' Association ; also the bulletins from each of the Experimental Farms, that is, the Experimental Farm at the Agricultural College and the Experimental Farm at Ottawa. I cannot too strongly impress on you the advisability of everybody becoming possessed of these reports and of the very valuable bulletins that are issued from time to time, giving a description of the experiments carried on at these two farms. I shall not detain you with further remarks, but will call upon Professor Dean, of the Ontario Agricultural College, to give you an address upon the result of his work during the past summer with his Travelling Dairy.

THE TRAVELLING DAIRY.

Prof. DEAN delivered an address on the subject of the Travelling Dairy. He said : In appearing before the Western Dairymen's Association for the first time, I feel that I am addressing men many of whom know more about dairying than I do, and I feel that it is almost an act of presumption on my part to attempt to address you at all. But, having made some study of the subject of dairying, and having devoted a good part of the summer to practical dairy work, I think, perhaps, it will not be uninteresting to you to have me lay before you the results of that work. Now, dairying in Canada, as we

know, has two main branches—co-operative dairying and private dairying. By means of the co-operative system, the dairy industry has advanced with strides such as have not marked the progress of any other industry. In 1879 Britain imported 200,458,752 pounds of cheese, Canada's share of that being 20 per cent. In 1888 Britain imported 214,772,992 pounds, and Canada's share was 41 per cent. That is to say, from 1879 to 1888 Canada advanced her share of Britain's imports of cheese by 21 per cent., and Britain imported over 14,000,000 pounds more in '88 than she did in '79. This has been done by having it nearly all manufactured upon the co-operative plan, by means of which the milk has been manufactured into cheese by capable and skilful persons. So great has been the advance under this system that for the year ending 31st March, 1891, the value of the exports of cheese from Ontario alone was $9,700,000. These figures will convey an idea of the greatness of this industry and will show how important it is that everything should be done to promote it. There are several means of promoting this industry. The first is the Dairymen's Associations of Eastern and Western Ontario, and the Creameries' Association, which last devotes itself to the advancement of the butter-making industry. We have the dairy school at Tavistock, concerning which we are to have a report at this meeting. Then we have the dairy department of the Agricultural College. I may say in reference to this that we have a dairy building where we shall have separators, an extractor and appliances for the manufacture of cheese as well as butter, and where we can give instruction in the manufacture of both. I have had a number of inquiries from young men wanting to know if we could give instruction in butter-making, because since the establishment of winter dairies in the vicinity of Mount Elgin and Woodstock the advantages of butter-making in the winter have become more manifest than ever. If we can combine summer cheese making with winter butter-making, we shall have perfection in the factory system. Progress is being made in that direction at the present time and with every prospect of success. I had the pleasure two or three weeks ago of visiting Prof. Robertson's winter creameries at Mount Elgin. There had not been time to get things into the best shape, nevertheless work was going on. Farmers were bringing in their milk and it was being run through the separator. They had an Alexandra separator with a capacity of 2,000 pounds an hour. The milk comes in any time during the day and when they get sufficient in they start the separator. The cream is put into the cream vat and ripened and churned. The skim and buttermilk are returned to the farm. The creamery at Mount Elgin is on the separator plan, but that at Woodstock is on the cream-gathering plan. I understand that the produce of both is to be shipped to Britain after three or four weeks with a view to opening a market for our butter. We have already a splendid reputation for cheese; no other country has better. How has that reputation been built up? By manufacturing upon the co-operative plan. By this plan we get an article of uniformly good quality. There is no use in sending a poor article to the British market. We find that in every line of production. Men who are engaged in the business of producing or exporting beef and cattle tell us there is no use in sending poor animals to Britain. The fruit-growers tell us there is no use in sending poor apples, for if you do you will ruin our reputation. So it is with butter; if we do not send a good article we will ruin our reputation and spoil the market for our own people. The Englishman is fastidious in his tastes. Give an Englishman good beef and butter and cheese—and some say good beer also—and he is all right.

If we are to make the most possible out of our butter, I am satisfied it must be by means of the co-operative plan which has been so successful in the case of our cheese. But, there is a good trade in the private dairy, and it is to that branch that I intend to confine my remarks this afternoon, dealing with it in the light of some things I observed this summer. The product of the private dairy can find a good market if you will make a good article. In this respect the same rule applies to the home as to the foreign market. Before going further in this line, perhaps I had better speak of the origin of the Travelling Dairy. No doubt all of you have read in the papers more or less about the Travelling Dairy. The Minister of Agriculture asked for and received a small appropriation to fit up a Travelling Dairy to go among the farmers and illustrate the best methods of manufacturing butter. I had the honor of being placed in charge of

the dairy. Our work was chiefly in the counties of York, Ontario, Simcoe and Durham, and during September and October we attended exhibitions, and during the latter part of October we went to Essex county. We endeavored to take with us only such utensils as would be used by the farmer in his private dairy. We did not get anything "highfalutin." Our outfit cost somewhere in the neighborhood of $40. You may imagine that in our work we had many difficulties to overcome. Now, to return to the point of which I spoke a few moments ago. There are persons who will pay a good price for a good article. We were at Port Hope at the exhibition there and made butter in the evening. There were a number of people from the town present. The cream was not first-class, but we made the butter, put it up in nice pound rolls wrapped neatly in parchment paper, and the people were almost climbing over one another to get it. They paid the woman who furnished the cream twenty-five cents a pound for it, and she could have sold ten times as much if she had had it. In Essex Centre we held a meeting. After we had got through a gentleman rose in the audience and said: "I want to say a word from the consumers' standpoint. (He was a merchant or lawyer in the town.) If I were to go into a store and see butter on the merchant's counter such as is ordinarily brought in by farmers and bought by merchants and marked at 15 cents a pound, and other butter such as we have seen made here to-day and marked 25 cents, I would take the twenty-five cent article every time. And I think I voice the sentiments of every consumer here." Nor were these the most extraordinary cases. At the town of Windsor we had our last meeting. When we got there we found that no cream had been supplied. (In reading the reports in the papers concerning the Travelling Dairy some might say, "Those fellows have fine fun, nothing to do but travel about and see the country and hold a little meeting now and again." But, I can tell you it was not always fun. Sometimes we would get to a place where we did not know a solitary person, and find no preparations made for our meeting. We had to have cream, or we could not do our work, and very often the cream had not been arranged for. Where we did not find it ready for us we had to go and look for it. So it was in Windsor. We went to a restaurant—an ice cream parlor—and asked if they had any cream. They had two gallons on hand. The man asked only two dollars for it. Out of that cream we got just three pounds of butter. From that fact you can imagine how rich the cream was. We were not likely to make much money out of the speculation. But we did not come out so badly as you would think. When the butter was put up for sale a gentleman in the audience said "I will give you fifty cents a pound for it." So we lost just fifty cents on the transaction. These instances all show you that there are persons in Ontario who will give a good price for a good article. We endeavored to illustrate, as far as possible, the best methods in the manufacture of good butter. Moreover, I always made it a point to visit as many private dairies as possible. When we went into a small village I inquired who had dairies, and visited these places in order to find if there were difficulties in their way, and to give them such suggestions as I could as to the best means to overcome them. I think it is not always the fault of the women or the butter-makers of Ontario that the butter has such a poor reputation. If a farmer wants a new mower or reaper or plow he gets it. But let the women folks ask for a new churn or something of that kind to make the work easier and improve the product, and at once there is grumbling and the question is asked "Can't you get along with what you have?" Many buy their dairying utensils and seem to want to have their dairy carried on upon the cheap plan. But you can't make a success of anything if you go upon the Cheap John plan. Get a good thing or don't get it at all. While it is true that if we are to establish a national reputation abroad for our butter and to secure a market abroad, it must be by co-operative dairies. It is also true that there is a great deal of money to be made by the farmers of this country through private dairies by making a good article the year round and looking for their customers in the towns and cities. We hear a great deal about our butter being of poor quality, and I had my eyes opened in regard to that subject last summer. When we got into a town like this (Brantford) or smaller I made it a point to ask the storekeepers about the supply. I hardly ever found a man but would tell us that he wished this butter business was far enough. Most of them said that if they came out even they considered themselves lucky. What the storekeeper

means by coming out even is to buy butter at say fifteen cents in trade and sell it at fifteen cents cash. Does it pay to make butter at fifteen or sixteen cents a pound, pack it, haul it to the store and then take the price in goods? It would be better to fatten the cows for market or devote the time and attention given to caring for them and the making of the butter to some other branch of work. But many of our farmers are doing that very thing. That is not so much true of this district perhaps, but go to the northern sections of Ontario where there are no creameries or cheese factories, and you find many farmers who trade their butter out at fourteen, fifteen and sixteen cents a pound. Then many of them came to me and said there was no encouragement to make good butter. "If I take the best of care and make a good article," they say, "here is my neighbor who is careless yet she gets just as much for the poorer butter as I get for the good." If you wish to get an idea of the quality of butter made throughout the Province go to some of the storekeepers and ask them to let you see the cellar where they keep the butter. I have seen only one merchant who has a proper place in which to keep butter. In one store in a certain part of the province I found the butter kept in the basement of the building, in a place where you could not stand upright. Over in one corner had been dumped a lot of bad butter and in this same place they were mixing up the good butter. How long would butter be likely to remain good in such a place? You would be surprised to see the butter in such places. White butter, yellow butter, butter in pound rolls, in five-pound rolls, in crocks and tubs and pails—butter in every shape in which it could be brought in. I was in a store when a lady brought in two crocks of butter. When she went out I looked at the butter and tried it. She had the crock full to the top, and the butter on the top was rank and spoiled. If she had not filled the crocks so full, and had put some parchment paper or butter cloth, and had made a salt plaster and covered it over, the butter, if it was good in the first place, would have kept for a considerable length of time. But in the way it was packed the best of butter would not keep. In private dairies I am satisfied the farmers do not get the cream all out of the milk. We tested milk during most of the summer. Many of you who have been reading on the subject of dairying know that the Babcock milk test is now being extensively used. In 17 samples of skim milk the average percentage of butter fat was .55; that is, for every hundred pounds of skim milk there was about $\frac{3}{4}$ pounds of butter left in. The highest sample showed 1 per cent. That means that for every hundred pounds of skim milk from 1 to $1\frac{1}{4}$ pounds of butter was left in. The lowest was .2 per cent of fat. That is very good, but where farmers leave 1 per cent of fat in the milk it is wasteful. But they say to me "Well, if I leave the butter or cream in the milk I do not lose it, for I feed it to my calves or pigs." But I simply ask this question: Can you afford to feed to calves and pigs butter that is worth 25 cents a pound? I have often been asked how to overcome this difficulty of butter-fat being left in the milk. If you use the deep setting method it is almost impossible to overcome it unless you have plenty of ice or cold water. In the northern part of the province, where the streams come down from the rocks and in many cases run alongside the road, there would seem to be no difficulty about getting cold water. One day when we were out we came across such a stream. Mr. Brown, one of the party who was doing the churning always carried a thermometer. He found that the water of the stream was at a temperature of 46°. A man on a rented farm had built a little shanty over the stream and dug out a place where he had put a little barrel. Here he set his milk in deep vessels. He dipped the water into the barrel, and when it got warm he would throw it out and dip in more. The thermometer showed that the water around his milk was 70° and I told him that the cream would not rise in water at that temperature, and suggested to him to dig a place in the bed of the stream and put in a box and set the milk in the water. The cold water entering would sink to the bottom and rising at the other side when warmed would flow over the side of the box. He was not aware of that fact, or else he did not understand how important it was to have the water cold. He thought it did not make any difference if it did get a little warm. He said he would do as I suggested. By that means he would get the cream almost perfectly, at least when the cows were fresh. From our experiments at the College we find that we may use all the ice we like but after the cows have been milking eight or ten months the cream will

not rise perfectly. Lately we carried out some experiments comparing the deep-setting with the centrifugal system in the case of cows that had been milking for some months. We found that the deep setting system left 6-10 and 7-10 of 1 per cent. of fat in the skim milk, or from ¾ of a pound to one pound of butter in every hundred pounds of skim milk. But with the separator we could take out the cream just as perfectly as from the milk of fresh cows. I am satisfied that the time is not far distant when the centrifugal plan, that is the separator, will be used nearly altogether in herds of 10 or more cows. In many cases it is difficult to get ice and, as I say, without ice or very cold water, and plenty of it in warm weather, you cannot get the cream out of the milk by the deep-setting method. But by the centrifugal system you have a machine, run by either hand or horse power, that, without the use of ice or water, will take the cream out more perfectly than can be done by any other method and will give you the cream in a condition to make the very finest quality of butter. It is even better than the other method, for impurities will be thrown out around the edge of the bowl and you will get the cream perfectly pure. At the present time when our cows yield from 150 to 200 pounds a day we separate once a day only, because it means considerable work to wash up the machine and get it ready twice a day. At night we bring the milk into the dairy. The next morning it is warmed up and the night's and morning's milk are run through together. Where a person wishes to run a private dairy on the best plan and make the best quality of butter, and wants to have the cows milk, not only in the summer but in the winter, the centrifugal is the best plan to adopt in a herd of ten or more cows. You can buy a separator for about $100 that will separate 25 gallons or 250 pounds of milk in an hour. It will not take long for one of these machines to pay for itself. Where a farmer has ten or fifteen cows it will pay to put in one of these machines. Some say this travelling dairy is not going to help the cheese-making or butter-making industry ; that is, it is not going to help the co-operative dairying. But I think it will. Ex-Governor Hoard says that the man who milks the cow is the most important subject we can talk about. Creamery men find that it is hard to get cream of the finest quality to make butter. If the cream is good you are quite sure the butter will be good if you have a good maker. The Travelling Dairy helps to educate the farmers in the best methods of caring for the cream and making butter. If farmers do not care to make butter, but prefer to have it made at the creamery, they will know how to take care of the milk and the cream and give it to the butter-maker in good condition. Thus by giving knowledge on the subject of private dairying we make it possible to carry on the co-operative dairy much better than at the present time. We found a number of difficulties in our way during the summer. Some people are not willing to learn anything. I often say that when a person gets to the point where he can't learn any more about dairying or farming, or anything else, then I pity him. When a man gets so that he cannot learn any more he had better shuffle off this mortal coil and leave for a happier clime. But when a man feels that there is something for him to learn there is hope for him. If people do not wish to learn it is impossible to teach them anything. I do not know exactly whether I ought to tell, but the incident has its lesson and I think I shall venture it. We held an institute meeting at a certain place half a mile from the home of a prominent agriculturist of the province. His wife, who, by the way, was not brought up on the farm, came, and also another lady who thought she knew all about butter-making. I was told of the following by one who overheard the conversation between this lady and the one who knew it all. The latter asked her "How long does it take you to churn?" Mrs. ——— answered "I seldom take more than twenty minutes." "Why," said the other, "I have churned sometimes for a whole day ; last week I churned for nearly two days. How do you make the butter come so soon?" She replied, "When the Travelling Dairy was around I attended the meeting. I took a note book, and I took down points that were given, and noticed carefully what was said and done, and since then I have had no difficulty." One came to the meeting and could not be taught, and the other came to learn and received information which has been of great practical use to her. This work will go on next summer. Two Travelling Dairies will go out. More applications have been sent in for a visit by the travelling dairy than one man could fill in three years. Mr. Dryden says he has a great many applications. If the people in the

vicinity of Brantford want a visit from the Travelling Dairy they would do well to make application to the Minister of Agriculture or to President Mills of the Agricultural College. Do not think that this work antagonises what the creameries or cheese factories are doing. We are only trying to show how to make butter for the local markets. As soon as the local markets are stocked, then the farmers must bring their cream to the creameries or cheese factories. I do not believe in this idea of sending all our best cheese and butter to Englishmen. Why should not Canadians have these things as good as the Englishmen? As we go around the country we find that scarcely one hotel in a dozen has butter that you can eat. You may think I am exaggerating, but if you travel about as I have done, you will find out that I am quite within the mark. What is the natural effect of this upon the butter market? If a man goes to a hotel where the butter is not good he does not eat much of it. But if it is good he will eat far more. The effect of this increased consumption must be an increased demand, and with an increased demand the price must rise. That is the way to get a better price for your butter.

INSECT PESTS.

Prof. James Fletcher was then called upon. The chairman in introducing him, expressing regret that the Professor's name had been wrongly given in one of the announcements of the meeting. Mr. Fletcher said: The matter I am going to speak to you about is far too important for it to make any difference what name has been given as mine. In this matter my name is nothing. I belong to the staff of the Experimental Farm at Ottawa. I am sorry to say that I have got a very long title—Entomologist and Botanist to the Central Experimental Farm. All that long title means that I am engaged in studying to find remedies for the various inset pests which destroy the crops of the farmers throughout Canada. I am engaged also in studying diseases of plants due to low forms of plant life known as fungi and the study of and the economic development of plants produced on farms. I have been asked to speak of that branch of my work which deals with injurious insects, and to-day I shall pay particular attention to those which attack crops of importance to dairymen. The work at the farm, as probably most of you are aware, has been divided under various heads. The Director is the head of the whole system of experimental farms which has been established for the whole Dominion. There is one farm in British Columbia, one in the North-West, one in Manitoba. The one for Ontario and Quebec is at Ottawa for it is thought that the problems arising under the conditions existing at Ottawa will pretty well cover all those which present themselves to farmers living in these two Provinces. In the Maritime Provinces there is another farm also. By this system it is thought that most of the practical problems that arise in the practice of agriculture can be investigated. The work at Ottawa is divided among the various officers. There is the Director who has general charge of all, the Agriculturist, Prof. Robertson, whose name is well known to you, as it is to every farmer in the country. There is the Horticulturist, who works upon such problems as concern chiefly fruit-growing and forestry. The Chemist analyses the various products and also analyses different soils and waters to find if they have the constituent elements desired. This is of importance to dairymen especially seeing that so much for them depends upon having pure water. All this is detailed in the annual report, which is sent to farmers who ask for it. This is the only restriction placed upon the distribution of the report. We believe that those farmers who take the trouble to ask for it will read it, whereas if we forced it upon them very likely they would not look at it. In addition to those I have given you there is also a poultry manager who carries on experiments in feeding and crossing, and so on, with a view to securing the best product; and lastly there is my own department. My work, as I have told you, is the study of the habits and life histories of the different injurious insects and plants that attack crops. Many people do not at first sight see the importance of this work, and do not seem to be able to understand it until they have suffered from the attack of one of these pests. But every man who has raised crops knows that a large portion of his profit is taken away by these minute creatures which he treats with con

tempt. The Americans, perhaps the most practical people on the face of the earth, have recognised the importance of carrying on those investigations, and they have now a large and well equipped branch of their Department of Agriculture with several men engaged in this work. In order to show the need for this work I have only to remind you of some of the heavier losses which take place every year. Accurate and careful statistics show that in the year 1864 the State of Illinois lost from one insect, the chinch bug, which attacked corn and other cereals, $73,000,000. In 1874 the State of Missouri lost from the same insect $19,000,000. In 1887 Iowa lost $25,000,000, and in the same year nine States which were infested by this insect lost an aggregate amount of $60,000,000 from their grain crops. These enormous losses, however, took place at a considerable distance from ourselves, and besides this, large amounts like these cannot be grasped by ordinary minds. They do not stir us nearly as much as the loss of a few hundred dollars from our own pockets. There is no farmer in this country who, unless he takes measures to prevent it, does not lose at least one-tenth of all his crops through the attacks of insects every year. Frequently that runs up to 25 and even 50 per cent., and not infrequently crops are wiped out altogether. He says, in explanation, if asked: "Oh, the weather was dry," or else: "Oh, the weather was wet, and so the bugs, or the grubs, or the caterpillars or something else came along." There is no reason why this should take place. Every insect that attacks crops, however small that insect may be (and some of them are so small that you can hardly see them without a microscope) has exact and regular habits of its own; it comes at the same time every year, and requires certain food and certain conditions, lacking which it cannot live. Directly we have learned the habits of these enemies they are within our power in most cases. I will give you a few instances to illustrate this. Take one hundred insects caught out here in the fields and submit each one of them to one hundred specialists in any part of the world—Europe, China, anywhere—every one of those specialists if he is well informed, will give you the same name for each insect, and if you ask them to give you its life history they will make statements which will be in accord with one another. Why shouldn't they? Each of those is as distinct as any other animal. Take the imported white cabbage butterfly, for instance. I may mention *en passant* that all white butterflies that we see flying by day are injurious to our cabbages. They are flying over our cabbage patches to deposit their eggs on the leaves; and here, I may say, that such a thing as spontaneous generation amongst insects never takes place as some people seem to suppose. They cannot come into existence without the previous existence of a male and female of the species that produces them. Lumbermen tell you that the borers come into existence in the wood when the bark sours. Every insect must start from a male and female like other animals. The female lays eggs which hatch into grubs, and it is in this stage that insects generally commit the greater part of their depredations. They after this take the chrysalis stage from which they emerge as the perfect insect. Each species of insect has its habits and each has its special food plant. Many of them feed upon only one kind of food plant, but some of them feed upon several; but generally the food plants of each species of insects are closely allied. You cannot find the caterpillar or the cabbage butterfly except in cabbages and allied plants, as mustard, radishes and turnip. The most important thing in looking for a remedy for any insect pest is to learn the life history of the insect—how it passses through its different stages, etc., what plants it feeds upon and how many broods there are in a year. That is what the entomologist must know before he can suggest a remedy. In many insects there are one or two broods in a year, and others may take two or three years to get through their different stages. Take the white grub, for instance, which is well known in the corn growing country. Plow up meadow land and plant corn and you will probably have trouble with the white grub and the cut-worm. The white grub takes three years to complete its growth. It comes from the June bug or May bug that flies around trees, particularly plum trees, in the evening. These insects copulate; and the female lays eggs in the ground near the roots of plants. The grub passes two years before it comes to full growth, after which it changes to a chrysalis and then a little later to the perfect bettle which remains in the ground until the following spring then emerges and only lives for a week or two. But the grub had been in the earth for parts of three seasons destroying the roots of the crop. Some insects live in the grub-state longer than this, one kind which is rare

in Canada, but is well known in the United States, actually takes seventeen years to come to maturity. It is called the seventeen year locust. After it emerges into the perfect insect it only lives for three or four weeks. But it is a most injurious insect before it comes to maturity. Many people come to my room and on learning what I am working at, they say: "Why, how very interesting!" Yes, very interesting!! It was very "interesting" no doubt for the State of Illinois to lose crops to the value of $73,000,000 in one year. It is very "interesting" to know that we here in Canada lose one-tenth of our revenue due to agricultural products every year; that our farmers lose one-tenth of all their products; and it is "interesting" to the United States annually to the tune of $380,000,000. That is a great disgrace to us, for the loss is mainly due to insects whose life histories are well known. Knowing the life history there is pretty certain to be a known remedy for these pests, which remedy we can learn if we will apply to those who have studied entomology. I am your paid servant, paid by you to investigate these matters. The Experimental Farm is being carried on for the use of the farmers of Canada, and for every one of you as much as any one else. It is true we live at Ottawa, and judging from the newspapers, some have accustomed themselves to look upon people living there as mere pensioners upon the people. But we are not, after all, all "boodlers" down there; but I am not going to try to persuade you on that subject now, for it is no part of my business to do so. But I am anxious that you should not allow that belief to interfere with your own interest. We are not boodlers at the Experimental Farm. Perhaps some might suggest that we have not much to boodle on even if we had no other safeguard. We have just one object in view and that is to make our work useful. We want the honor of doing that, even if we can't get much pay for it. None of the appointments at the Farm have been political. Moreover I do not believe that it is possible to find another staff among whom so little interest is taken in politics. Why? Because we have not the time. We have more important things to attend to. We have only a few years, each of us, in which to do our work, and we are proud of the work we are doing. That is why I do not pay much attention to the man who comes and tells me that my work is "interesting." But when a man says my work is useful, when he sees that it is of value to him, and says he wants to get something out of it for himself, then I want to give him my whole attention and find out how I can assist him. I am thankful to say that it is seldom that a man comes to my office but I am able to tell him something that will help him about insects or plants. And why should I not? Have I not been employed there for no other purpose for some years past? The man who devotes his whole attention to one subject, who gives all his time to the carrying on of a certain line of experiments, ought to be better informed upon that subject than others. What is the use of the Experimental Farm? You are all experimental farmers to a certain extent. But it would not be wise for you to do the work that we are doing. We try experiments there when there is even a possibility of success. We score many failures, but we expect that and these failures do not stop our work. Our failure is your success, because it will make it unnecessary for you to try to carry into practice some of these hare-brained theories which we see recommended every day in the agricultural as well as general press, on farming questions. In my own particular line of investigation—that of insect pests—I do not hesitate to say that half the paragraphs you see copied from newspaper to newspaper are mere rubbish. They are written by people having no special knowledge of the work. They evidently think that no one will know the difference; but those who try to carry out or act upon what such writers say will soon find the difference. I will give you one instance. Is there a man here who has not read that if you put salt round corn hills it will stop the ravages of the cut-worm? If any man has tried that and succeeded, he has had an experience far different from mine. Every farmer suffers from cut-worms. These insects have been made the special subject of investigation. Now, all insects may be separated into two classes, according to the kind of mouths they have. If their mouths are is made with jaws, as ours are, they must bite their food in order to eat it. But if, instead of jaws, they have a hollow tube, like the mosquito, they must take their food in a liquid state. If you have "potato-bugs" on your potato plants and do not put Paris green on the plants, as some of these wonderfully progressive men would have you do, you will have nothing left in a few days but stems without leaves. On the other hand, when a mosquito alights on your hand to feed upon you, it does not

bite a piece out as the black fly does. After it is gone your hand is apparently as perfect as before. But the fly has got what it wanted; it has taken some blood from you by sucking it up through the hollow tube with which it is provided, it has also left a memento in the shape of some poison to remind you that it has been there, but that does not affect our present question. All insects, as I tell you, are divided into these two classes—those which bite their food and those which suck it in a fluid state. Now, what is the use of this information? What is the good of finding out whether insects have jaws or tubes? I will show you. We have to deal with them in different ways according to what we learn of them in this respect. You know what "silver-top" in hay is. In May or June you have seen the leading stems of blue grass and timothy turn white. This very frequently occurs where farmers have kept their meadows standing year after year. All of a sudden they find the greater portion of the grass has been destroyed by silver-top. This is the work of an insect that sucks the juice out of the plant. It sucks out this juice at the point where active growth is taking place—at the bottom of the first joint. That is where the sap is going through to feed the flower, and the food of the flower being thus cut off, it dies. Now, if we put poison on the potato plant the insect that feeds on that plant eats the poison as well as the leaf and dies. But if we put poison on a plant from which the juice is sucked, the insect pushes its tube through the poisonous covering of the plant, takes its food and leaves the poison. What remedy then, you may say, have we for such insects? We have now one of the most remarkable remedies ever discovered. We have a substance which while a deadly poison for insects is not a poison for human beings and the higher animals. This is "insect powder" or pyrethrum. If you were to take any small quantity, say half a teaspoonful, it would not act as a poison but as an emetic. But, on the other hand, if you place only a small quantity upon most insects they are dead in a few minutes. Since ten years ago, when Prof. Saunders made the discovery of its applicability for outdoor use against insects, it has been largely used as a destroyer of flies. Many of you probably know that if this room were full of flies and you were to puff some pyrethrum from one of the little powder guns, now obtainable almost everywhere, about the windows, in ten or fifteen minutes the flies would be lying dead upon the floor. The poisonous principle is given off in the atmosphere, and every insect that comes within the influence of the poison is paralysed. Some of you may not know that if you cut off an insect's head it would be able to breathe just as well as before. Insects do not breathe through their heads in any way, but through small openings in their sides. The head is simply a support for the eyes, their mouths, and the sensitive organs of touch which they have projecting before them. If you will note a particular fly and follow its movements you will see that every few minutes it flies to the window and tries to get out. Flies are restless creatures. So if the pyrethrum is blown into the air near the windows every fly in the room will soon come within the range of its deadly influence. Two or three years ago I went to the lumber woods to investigate the borers that destroy, it is estimated, millions of dollars worth of logs when they are cut and left in the woods, besides doing immense damage to standing timber when injured in any way. When we got to the shanty my friend called out for one of his men. The man was rolled up in blankets, though the thermometer stood 80° in the shade. The man had taken to the blankets because he had been driven out of his mind almost by the mosquitoes. I said, "Where I come from we don't stand any of this nonsense," and I took from my pocket a little package of pyrethrum. I wish you could have seen my friend's face as I made a little pile of the powder, about enough to cover a two-cent piece. He looked on in a most incredulous way and said, "Well, if we are going to stay here I'd better get the smudge going," and out he went. But I was at work at my own little smudge. I set fire to the pile, and in ten minutes the room was clear of mosquitoes. You could hear how they expressed their disapprobation of the treatment to which they were subjected. Before the smoke began their song was that well known continuous confident and expectant buz-z-z z-z with gentle modulations, but when they began to feel the effects of the fumes, they found they had something else to think about, and their song soon shortened down to "bz-t," and that was the last we heard. Those who have travelled north of Lake Superior will know that there is an insect that is too frequently a very unpleasant companion at night in your bed. A little of the pyrethrum

dusted in the bed will soon stop the operations of those gentry too. This substance can be mixed with water and sprinkled upon cabbages or other plants that are grown to be eaten. It is perfectly harmless to human beings and can be put upon the crops where Paris green cannot be used. Some say that Paris green is no good to destroy certain insects. There never was an insect that I have come across that could take arsenic and live. Sometimes we hear people say, "We put on Paris green and it had no effect whatever." But in every instance where I have made investigations such statements have been found to be inaccurate. Paris green is poison to every living animal. For that reason there are certain crops upon which we cannot use it because the leaves are the part we use as food. It takes about three months under the most favorable circumstances, namely on the ground, and exposed to the humous acids of the soil, before Paris green becomes oxidised by exposure and its poisonous properties are thus destroyed. The question will naturally suggest itself, "Why, then do you use it for spraying apple trees?" for this is one of the things we have been trying to persuade farmers to do so as to save their money for them, fruit growing having now assumed such importance in mixed farming. Spraying apple trees with water in which Paris green has been mixed is the best means of destroying the codling moth and the canker worm. For this purpose one pound of Paris green is mixed with 200 gallons of water and this quantity will spray about 150 ordinary sized trees. After spraying a tree the amount of poison left on each apple is so exceedingly small that even if it remained there a man would have to eat several hundred bushels of fruit at once in order to get enough poison to kill him. But it does not remain on the apples or plums when sprayed for the curculio, for we know that the greater part is washed off by the first rain, and even if there were no rain at all, the natural increase in the size of the fruit as it grew to maturity would force off its surface any particles of the poison which remained there. In every part of Canada, however, as we all know, we are not deprived of rain during the growing time of the year; we have frequent showers, and have in fact the finest climate in the world to produce good fruit and everything else, and this is what we are going to prove to the world next year at Chicago.

But in order to make a good show of your fruits and vegetables you must come to the entomologist to learn how to keep off the grubs and insects, therefore you must be prepared with remedies. Remedies are either active or preventive. An active remedy is the application to the plant of some obnoxious or poisonous material which kills the insect outright and prevents it from destroying the crops. A preventive remedy is the application of some obnoxious matter or mechanical contrivance so as to keep the insect from getting at the crops. In the case of the canker worm, for instance, we used to put bands of cotton wool around the trees, because we knew that while the male had wings the female was a little creature like a spider that could not fly, but must climb up the tree in order to lay its eggs on the branches. These eggs hatch out as caterpillars which destroy the leaves and then when full fed drop to the ground, and having buried themselves they change to the chrysalis stage and emerge at length in the form of the perfect insect. The bands of cotton wool offered no foothold for the female insect and so prevented it from climbing the tree. But we found that the rains matted this material so that in a short time its usefulness was gone. Other similar mechanical contrivances were tried, but never with general and complete success. Since we have persuaded orchardists all over the country that Paris green is a safe remedy, there has been a decided improvement. The trees must be sprayed in the spring after the flowers drop. There is a general idea among bee-keepers that if you spray during the time that the flowers are open the Paris green will fall into the flowers and the bees will be poisoned. Now, I don't believe much in this; but I have no exact information on this subject, but I have planned some experiments for next season by means of which I shall be able to investigate this question fully. Directly the flowers are gone you are in time to destroy most insects that attack the foliage or the codling worm which attacks the fruit. Of this latter, the egg is laid while the flower is open. The caterpillar which is hatched out is extremely small and delicate. The minutest particle of poison that you can possibly get into the flower is sufficient to destroy the insect at this stage. But it must be put on before the weight of the apple has altered its original position. Most of

the flowers are born upright. When the petals have fallen and the tiny apple appears, it is in the same position and remains so for some time, and the egg does not hatch for a week and often more than that, so that you have ample time after the flowers are gone to apply your poison and destroy the insects. There is no advantage in spraying the trees until the bloom has fallen. Before I sit down there are two other insects that I want to speak about that are of interest to you as dairymen. Gentlemen, have you ever been troubled with the "turnip fly" on your turnips? I know you have, everyone of you who has grown turnips. Perhaps you will be pleased to learn that there are few insects that are more easily kept in check. I dare say many of you have read of the remedy of soaking the turnip seed in turpentine, perhaps some of you have tried it. I have tried that plan and it has always failed utterly. That is one of the newspaper receipts. There is one method that is always effective. If you mix one part of Paris green with 99 of land plaster, or better still, if you make it one part to 25 of land plaster and then sift or dust that on your turnips, you get a mixture that will destroy any insect. Any other fine powder will do in place of the land plaster Flour will answer if you cannot find anything better. I advise land plaster because it is a good fertiliser itself, so good that it is quite common to use it alone as a fertiliser. Have you ever considered why the turnip is injured by the "turnip fly?" It is because of the attack upon the first two leaves that appear. These are not true leaves. They are "seed-leaves," little bags of food provided by the parent plant to feed the young plant in its early stages. The albuminous matter is stored up there. If you wish to test this, go to your radish bed in your garden in spring and you will see first two heart-shaped leaves appear. If you pick these off your plant will die. If you take off one the plant will be much weakened and make very slow growth, and the effects of an apparently slight injury at this stage are easily seen. Later on the plant can overcome the attacks of its enemies, for it produces more substance every day than the insects can eat. This insect is so abundant in Vancouver Island sometimes that it is not unusual there to sow turnips three or even four times. At Ottawa the best time for sowing is about the middle of June, not later than the 20th. Thus we bring the crop above the ground after the first brood of the "turnip fly" has appeared. The "turnip fly," or more properly Turnip Flea-beetle does not occur the whole year round. It occurs the first thing in the spring, because it passes the winter in the perfect state, but we know nothing about it so far as field crops are concerned. The market gardener knows it though, because it is attacking his early cabbages and radishes. By about the middle of June the first brood has disappeared, and it is passing its second stage in the ground, the eggs having been laid at the roots of plants of the cabbage family. The second brood will not appear until August. But by that time the turnips have attained such growth that they do not suffer from the insect's attack. Now there is another dire enemy—the cut-worm. We need not expect to grow tomatoes and cabbages without knowing how to outdo the cut-worms. There are two very good remedies that everybody ought to know. The simplest of these is to have a little roll of paper to place around the young plant when setting it out. Let it extend about an inch and a half above the ground. The cut-worm is produced from the eggs of a moth. There are about three hundred different kinds of cut-worm moths in Canada. The eggs of most kinds are laid in the autumn. I have some now at Ottawa about half grown. In the autumn many weeds and other vegetation are left on the ground, because the farmer is about tired out with his long season of work, and as he is not going to get any more crop off the land he puts off cleaning it up. But as the spring approaches he longs for the time when he can go on the land again, and when the time comes he starts in with energy, plows up everything and makes his farm look as nice and neat as he can. He and the winter together have cleared off every weed. But he finds that after he has set out his cabbages or tomatoes, the very first night several are cut off, and there is no sign of any cause for the loss. The cut-worm has been there. It had been in the ground since the previous autumn, and when winter came on it made a cell in the ground and remained there all the winter. In the spring the cut-worm revived and started out at night to find something to eat. He found nothing but the farmer's cabbages or tomatoes so he took them. It is not that he likes them better than anything else, but they are the only thing he can find. Later on they leave the cabbages and tomatoes and attack

such tender plants as the common "lamb's quarters." Now, the remedy I mention involves hardly any expense and very little loss of time, and you save not only the cost of the plants but also the time of setting out a second time. And besides you get the crop ready for the early market, which is a very important thing. Some people who are very nice about this matter have little tins made instead of the piece of paper; these are very easily handled and can be used year after year. It is surprising that such a small barrier as a piece of paper should protect the plants so effectively. Cut-worms move at night and crawl on the surface of the ground looking for food. When they come to the paper they know that that is not what they are looking for and they make no attempt to climb over, but go on still looking for food, and before they have found any morning has come and they have to hide again for the day. In the case of the tin they couldn't get over, no matter how hard they tried. The other remedy I mentioned is poisoning them with poisoned baits. Generally in the spring you can find some kind of vegetation. Take grass if nothing else offers. Get about a cartload of it. Tie it up in little loose bundles about three inches through and six inches long. Make fifty or a hundred of these bundles, then dip them into a strong mixture of Paris green. Throw them into a wheelbarrow and take them out to your field or garden and drop them at intervals of fifteen or twenty feet. Many of you will at first say, "I don't think there is much in that business." But try it. I had rather the same idea, but of course it would not be reasonable for one in my position to refuse to try a thing just because it did not happen to present itself to me as sure of success. I got a farmer near Arnprior to try it on a fifteen-acre field of turnips. He afterwards said it paid him over and over again. We were compelled to take weeds; we used "pepper-grass" and "lamb's quarters." Did you ever notice that water will not lie on a cabbage, but runs off in little silver bubbles. Nature has protected the cabbage and many other plants with a coating of wax which prevents water from resting on them as on other plants. The same is true of lamb's quarters. So we had to use our brains to get the water to stick. When you want to clean your hands after you have got them greasy you use soap. That is what we did. If you use lamb's quarters in applying this remedy for cut-worms rub a little soap into the water which is to receive the Paris green, and then the mixture will adhere to the plants. If the next morning you look under these bundles you may not at first find anything. You must remember that cut-worms come out at night, get what they want and then go back and hide. Paris green though a deadly poison is a slow one, and it takes effect only some hours after the insects eat it. Every year I hear from people whom I have persuaded to use Paris green that they used it in the morning, and on going out in the afternoon they found the plants in as bad condition as before. And so they tell me very often they just put it on again. But if you are patient you will find in a few hours that the insects you tried to poison have disappeared. If after trying this remedy for the cut-worms you will look just beneath the surface mould, you will find the cut-worms are there all right, and you can see through their thin skins and notice the Paris green in their stomachs. That remedy is practical I know, because I have tried it. The use of the paper as I have described is also a good thing, for out of a hundred cabbages planted in that way last year we saved 98. We can probably get a remedy for almost every insect that is known. When we have learned the life-history of an insect the most important step has been taken. Remedies must be effective, cheap and practical, that is they must do the work they are tried for, must not cost more than they are worth and must be convenient in their application, and it is in the discovery of such remedies that my work at Ottawa consists. There are as many insects attacking the crops used by dairymen as attack those of any other branch of the farming profession. It is of moment to you therefore to know what is being done to protect the crops in which you are interested. If I have given any of you information that will be of use to you I shall be well repaid for coming here, and if I can give you further information I shall be glad to answer any questions you may be pleased to ask.

THE WOODSTOCK CREAMERY.

Mr. J. A. Ruddick was then called upon to give a report upon the work of the Woodstock creamery. He said: This is very sudden. I have just entered the hall and had not the slightest idea that I was to be called upon to speak until this evening. I understand that you only expect an address of a few minutes from me and I shall not dissapoint you in that respect. As your chairman has announced, I am in charge of the Dominion Experimental Creamery, near Woodstock. Most of you understand the scheme of these experimental creameries no doubt, as a good deal has been said about them through the press and otherwise. I thought it might be interesting to dairymen to know how we are carrying on the work there, and what it has been necessary to do in order that we might carry on that work in an ordinary cheese factory. The factory we occupy is known as the East and West Oxford cheese and butter factory. It is one of the ordinary factories of this western part of the province. When I went there about the 8th of November they were making cheese, and we found it necessary to make alterations so as to make the place warmer. We have to carry on our work during the coldest weather, and it was necessary to improve the place so that there would be no danger of frost. We boarded it up around the foundation and put on double windows throughout. Now it is quite warm enough for our work. We use the making room for our work room. The vats are set to one side and we do not require all the room the place affords. We have a platform something like a table, only a large one, to set the cream vats upon. The system adopted is the cream-gathering system. We have no separator, and do not take any milk at the factory; we send out men who collect the cream from the patrons in the neighborhood. I ought to say a few words about the collection of the cream. We have specially constructed cans to carry the cream in; they are made with non-conducting sides so that the cream does not freeze even on the coldest day. The same thing is of advantage in the summer time, because it prevents the heat from spoiling the cream. The driver takes as many cans as are necessary to hold the cream for his route. He takes a wide circuit, going by one road and coming back to the factory by another. One of our teams covers in this way about twenty miles. The driver takes a measuring can exactly ten inches in diameter, one inch depth of which measures a standard inch of cream, which we make the basis of calculation for the payment of our patrons. When the driver arrives at a farmer's house he measures the cream in one of these pails and takes a sample in a bottle provided for the purpose. Arriving at the factory the cream is poured into the vats set upon the platform and the samples are put away to warm. They become very sour and thus will churn all the more easily next day. This cream comes in during the afternoons and is left until next morning. We collect the cream every other day and so we have three churnings a week. The samples are churned in the oil-test churn, which shakes 350 times a minute, so the cream is thoroughly churned. Every particle of butter-fat is taken out in the butter. We reduce the butter to oil, thus finding that there is a certain percentage of fat in the cream, and so are able to calculate, from the number of inches of cream, how much butter the cream will yield. We have found, by comparing the test with the actual result, that the test is a reliable one. Our patron is credited with the amount of butter in his cream according to the test. The butter is put up in the best possible way. We use a tin-lined tub with butter-cloth. There is no object in that except that the butter will turn out more readily from a tin-lined tub and the butter has a better and closer appearance when it is turned out. As to the cloth, you know how, in making cheese, if you neglect to put a cloth over the top and put a bare wood follower on it, it will not make a rind. The cloth has the effect of making the surface close. Another feature of this experimental creamery is that cheese-makers are free to come there and learn all they can about butter-making. So far we have had quite a number of cheese-makers and others come to spend several weeks with us. Not long ago we had a gentleman from the Eastern Townships, a cheese-maker, who won the Dominion sweepstakes prize last fall. Another young man came from Glengarry, and several others have come from considerable distances. I do not know that I can say anything about the experimental creamery at Mount Elgin. Mr. Dillon, who is in charge, will probably be here, and will give you an idea of how they are doing business there. They

have a separator there and make butter every day. They have a large supply of milk and make quite a lot of butter. I have spoken without opportunity for preparation, and have not covered all the ground, but if there are any who desire to ask any questions I shall be glad to give any information I can.

A MEMBER.—What would be about the cost of fitting up a cheese-factory for the work you are doing, including the cost of the separator? Do you prefer the separator plan to the plan on which you are working?

Mr. RUDDICK.—That would depend a good deal upon circumstances. No doubt the separator at Mount Elgin will give the best satisfaction, but at the East and West Oxford creamery it would not because there is no large supply of milk in the immediate vicinity. At Mount Elgin they have a supply. Where you have to haul milk a long distance the results are not satisfactory. The skim milk has to be returned and that means that the teams have to go back. In our case they make a long round but when they return to the factory they are done. The buttermilk belongs to the patrons; it is sold and the proceeds divided. As to your other question, I suppose you mean the cost of fitting up a factory and providing the necessary utensils?

A MEMBER.—Take a cheese-factory such as that at Woodstock. That is a first-class model cheese-factory. What would be the probable cost of fitting that up to put it in such condition as you have it in now?

Mr. RUDDICK.—I cannot give you the exact figures, but I can give them approximately. Some repairs were necessary and must have been made even had we not taken the place. The cost of these repairs and of the improvements necessary for our purposes was something like $250. The machinery is not very extensive. The carrying cans cost $10 apiece; the cream vats cost $40 apiece. Probably Mr. Pearce can answer that better than I can.

Mr. PEARCE.—The churns run according to size, from $40 up to $60.

Mr. RUDDICK.—A thirty-gallon churn costs about $50, I believe.

Mr. PEARCE.—Yes.

Mr. RUDDICK.—Two cream vats, a churn and a butter-worker are all the machinery we have.

A MEMBER.—What quantity of butter are you making?

Mr. RUDDICK.—We have not been making very much—about 700 lb. a week.

A MEMBER.—How many teams have you engaged?

Mr. RUDDICK.—Two.

A MEMBER.—How do you pay them?

Mr. RUDDICK.—So much a trip, according to the length of the trip. One man is paid in this way—he gets $1 a trip and one-half cent a pound for all the butter he gets. That being so, he has an interest in working up his route and getting all he can. I think that is the best plan.

A VOICE.—How far do they travel in a day?

Mr. RUDDICK.—One driver covers twenty miles in a day. I am not acquainted with that part of the country myself, but he tells me that is about the distance he has to go. I think it must be about that far.

A VOICE.—Are the patrons allowed to feed what they please to the cows?

Mr. RUDDICK.—No doubt the quality of the feed has a good deal to do with the quality of the milk, but so long as the milk comes to us in satisfactory condition we cannot very well dictate what they shall feed. As a rule the farmers through that part of the country are pretty good feeders, I think. Some have ensilage, some have roots, and nearly all feed meal of one kind or other, chiefly oats, I think.

A VOICE.—Have you any objection to turnips?

Mr. RUDDICK —There is an objection to turnips, but at the same time we have been getting milk from a good many farmers who use turnips and we have had no difficulty about making good butter out of the milk. They are not feeding them heavy, and we endeavor to have them feed turnips, not in large quantity and directly after milking. We have never had any trouble from that source ; we have never had any butter you would call turnipy. You will understand that in the section where we are they were not prepared for this work, in fact they knew nothing about it until 1st November. We have to take them just as we find them, and they have done very well. The cream is coming in in good shape and we have had no trouble in any way. A great many are milking cows that have been in calf eight or nine months, new milch cows are coming in and the supply is being kept up in that way.

Mr. J. S. PEARCE.—Has Mr. Ruddick made any comparison to ascertain if the patrons of his creamery are getting as much cream out of their milk as those at Mount Elgin? Would it not be practicable with many of the patrons of his factory to use the hand separator where they have ten or fifteen cows, instead of setting the milk in cold water? I should think it would be well to investigate that and give the public the benefit of the report.

Mr. RUDDICK.—I cannot answer the first question very well ; it is not easy to compare things in that way. We do not know that every patron takes the trouble to weigh his milk to know just what he is doing. I have asked them to do that and some, I know, are doing it, and these can tell how much butter they are making per hundred pounds of milk and so on. One gentlemen who makes 75 pounds a week told me that he had made his butter during the month of December out of 20 pounds of milk, and I understand that is pretty near what they are doing over at Mount Elgin. However, that would not be a fair comparison for the whole factory. They are not all doing as well as that ; I fancy some have not done nearly so well. I know the gentleman I speak of has a silo and has fed pretty well, and has some new milch cows to mix along with the stripper cows, and the results of the milk are more satisfactory. As regards the hand separator, I have urged some of them to try it. The cream could be better taken care of than the milk, and there would be a gain in the quantity of butter made from the milk. You cannot get all the cream from the milk of these stripper cows that have been milking eight or nine months unless you use the separator, but the separator will take it all out.

Mr. J. E. HOPKINS.—This branch of dairying is only in its infancy. If we can make as great strides in it as we have made in the manufacture of cheese under the factory system it will be a great boon to the dairy industry. If there has been any loss in the dairy business I think we are willing to admit that it has been in keeping cows for seven months in the year when they are not paying us anything. All through this country for the past three years we could find parties keeping cows that did not pay their way for more than four months in the year. If we could make our cows pay us for ten months instead of six or seven as we are now doing, it would be a great saving. I think that is the great question for dairymen to consider. Then we want factories established such as Mr. Ruddick has been speaking about. Then five or six farmers could combine and get one of these separators, keeping it at some central place whence the cream could be taken every day to the factory. By feeding the cows properly we can make them pay their way for ten months in the year. This is a question worthy of our consideration. We know how much it costs to keep a cow, how much feed is consumed through the winter. If we can learn how to make this feed yield a profit it will greatly benefit the farmers.

A VOICE.—Can Professor Fletcher give us some information about the clover beetle?

Prof. FLETCHER.—Just as with the others, you must get back to its life history. This insect furnishes a very signal instance of what can be done by understanding the nature and habits of an enemy of any crop. I have often used the case as an illustration. The clover moth passes the winter in a little cell two or three inches below the surface of the ground. It comes out in the spring about the time the clover heads are forming. It is a tiny creature, so small that an ordinary sized pin would take two or three on the head of it. The eggs are laid in the forming heads of the flowers. The eggs hatch and the

young insect appears in the form of a pink grub. This goes into the calyx or surrounding envelope and eats through the tube into the forming bud and destroys the seed of the clover. The clover is ripe about the 1st July, and all you have to do in order to escape the grub is to get your clover ready by the third week in June. By that means you destroy the first brood. If you wait until the end of June the grub is sufficiently advanced directly your crop is cut to get out of the clover head and get into the ground. If the crop is ready to cut earlier the grub does not injure the clover and it cannot get out, so it is destroyed in the heads. There is nothing then in that locality to lay eggs for the production of a second brood, and so there is no danger to the second crop, except, of course, from your neighbors' fields or from the hedge-rows. But these creatures do not fly long distances. The practical result of this treatment where it has been tried for years in Canada is that a good crop has been grown in one field while in an adjoining field, where the same measures were not used, nearly the whole crop has been destroyed. The clover-seed crop of Canada ten years ago was worth half a million dollars; five years ago we had to import clover-seed. We have a special advantage in this matter because buyers will pay a higher price for Canadian-grown seed, so there is always a market for our clover-seed when we have it.

A Voice.—I would like to ask Mr. Ruddick if better results could not be had by heating the milk of stripper cows with hot water?

Mr. Ruddick.—There would be an advantage in raising the temperature, but the same results would follow from raising the temperature by other means. The cream will rise a little quicker, but it is not much more perfect. In fact, under some circumstances they found it the reverse. The difference is very little in any case, and it would not be profitable in dairy practice. The great point is to get the cream set as near as possible to the place where the milk is taken from the cow. It should be set in water below 50 degrees. The cooling of the milk is what raises the cream. The cream comes to the top because it is lighter and the difference in weight is greater while cooling than at any other time, consequently it is important to get it set warm.

A Voice.—Is it not better to submerge the milk?

Mr. Ruddick.—It is better in using the ordinary set-can, that is the can eight inches in diameter to set in water as deep as the milk is in the can. The greater the volume of water, of course the longer it will keep its temperature. The patrons of the creamery are highly pleased with the results so far. Different men—and women too—have come into the creamery and have told us that they make more butter than they could make themselves out of the same cream. By churning it together and at the right temperature we get all the butter. We test the butter-milk and find less than one-tenth of 1 per cent. of butter-fat remaining in it. Most of the patrons told us when we began that they would not have any milk by Christmas, but they have kept their cows milking and we are now making about as much as we have made at any time with the same patrons and we have some others.

A Voice.—What is the cost of manufacturing a pound of butter, including interest on the money invested?

Mr. Ruddick.—The plan is to charge the patrons 4 cents a pound for making the butter. We do all the work, including the collecting of the cream. We pay for the package, ship the butter, market it and give the patrons what it brings, less 4 cents a pound.

A Voice.—How much do you get per pound for your butter?

Mr. Ruddick.—We have not realised yet. The patrons are getting 15 cents a pound advance on it, but it is hoped that it will bring considerably more than that to them.

A Voice.—How much salt do you use?

Mr. Ruddick.—About $\frac{7}{8}$ of an ounce to the pound.

A Voice.—Do you use Canadian salt?

Mr. Ruddick.—Yes; Canadian salt—Rice's salt.

THE ENGLISH SPARROW.

A Voice.—Can Prof. Fletcher tell us how to get rid of the English sparrows?

Prof. Fletcher.—I can tell you one thing about them and that is they do not kill insects, or if they do it is only for a short time in the year. It was stated two years ago in Ottawa that there was no protection for the English sparrow, and the only way to do is to let everybody know that. There is only one way to kill them off and that is to keep on poisoning and shooting them. But they are a cunning bird and somehow they seem to communicate to one another the fact that the grain offered them is poisoned. We found that after a short time they would not eat the poisoned grain. We shoot them all the time and destroy their eggs and still they are pretty numerous. In the winter we clear a long line along the barns and sprinkle grain. Thus we get a good shot at them. Fire a foot or so over their heads. The first half-dozen escape and the rest catch it. We kill two or three hundred a day that way. That is the only way you can do, so far as I know. The way to insure their extermination is to let it be known that there is no legal protection for them and that they do not kill insects. It is true they will kill a few, but did you ever notice the way their bills are made? Now nature never wastes anything. The sparrow's bill is a pair of little grind-stones, and they are like other grind stones—made to grind grain, not to eat insects.

The Convention adjourned until 7 p.m.

EVENING SESSION.

The Convention resumed at 7, the President, Hon. Thomas Ballantyne, in the chair.

THE PRESIDENT'S OPENING REMARKS.

The President.—Members of the Western Dairymen's Association, it gives me great pleasure to be with you this evening. For the last six weeks I have been somewhat under the weather and at one time thought it possible I could not be here. I am thankful that I am sufficiently well to attend the meeting, for if there is one thing I take an interest in it is in a meeting at which affairs relating to dairying are to be discussed. At your last Convention, in my absence (as I was called away by imperative business) you did me the honor of electing me your President. This is the first opportunity I have had since then of meeting the members of the Association to thank them for the honor done me on that occasion. I know of no position that is more honorable than that of President of your Association. The past year has been an important one for the dairying interest. There has been almost a new departure in many ways. The business now is far different from what it was when we first met twenty-four years ago. I was present at that meeting and was elected a director, and you have done me the honor of continuing me as a director ever since. Then we were creeping along in the dark. We knew but little, and, though we were anxious to learn, there were few to teach us. Even those who presumed to be the teachers we now know to have been only the blind leading the blind. We have now arrived at a different stage of our existence and, instead of discussing questions of the building and equipment of factories, we have come to the stage when more active and vigorous measures must be adopted so that the quality of the product may continue to improve from time to time. The Western Dairymen's Association was the first to make a departure in the direction of employing instructors to visit the different factories. It was forced upon the attention of us who had to do with the matter that while some factories were turning out fine goods, a considerable proportion were making inferior. It was thought that if we could employ some capable person to visit the factories and explain the principles and practice of dairying and make such suggestions as might be necessary in each case, it would have the effect of improving the quality and making it more uniform. We were the first to make a step in that direction. In this we have been followed very generally by other associations and

with the same good results that we have found. The plan has been adopted not only in this country and the United States, but also in the Old Country. A year ago the question of employing instructors and opening a dairy school was discussed. The school was established at the commencement of the season and has been in operation all year. It has been taken advantage of by some 105 cheese-makers, who stayed a shorter or longer time as suited their convenience, usually about two days. You understand it was not a school to qualify as cheese-makers those who had no previous experience. We know from experience that it takes longer than a day or two, longer than a year or two, to make a successful cheese-maker. In addition to the dairy school, a report of which will be submitted to you, which report will be open for discussion, there were four instructors appointed to visit the factories testing the milk, not with a view to a thorough test as such—for that would be impossible without a much larger staff of inspectors than we were able to employ—but in order that those engaged in the factories might see how it could be done. The result has been a great many prosecutions, which have had the effect of calling attention to the importance of having a pure milk supply. There have been a great many prosecutions and a great many convictions. There has been one appeal, and, singular to say, notwithstanding the clear statements of those who framed the law, and who probably were better able to judge what was necessary to a conviction, the conviction was quashed. If any change in the phraseology of the law is necessary in order to make the meaning plain so that such a thing cannot occur again, no doubt it will be made. These inspectors have worked honestly and faithfully so that a uniform system of inspection and instruction might be pursued. They met monthly at the dairy school, saw what was being done there, compared notes and then returned to their work. Last year was the first year when we had any instrument which could be used by men of only ordinary skill and intelligence, by means of which we could thoroughly test milk. We did test milk, of course, for every one remembers that when factories were first established it was considered a part of the business of the manager to be able to inspect the milk supplied. We had at that time milk-gauges and lactometers, but these were not wholly satisfactory. Prosecutions have taken place against those who tried to defraud the factories, but there was no means whereby the milk could be paid for according to quality. A little more than a year ago an instrument was perfected known as the Babcock test and our inspectors have been using it. Mr. Bell, who had charge of the dairy school, along with three or four others, spent a term in Wisconsin a year ago and learned thoroughly the use of the instrument. The inspectors were carefully instructed in the use of it and instruments were supplied to them. Attention has been called to the Babcock test because of the prosecutions that have taken place, and also by Prof. Dean in connection with the Ontario Experimental Farm. They have had a Travelling Dairy in order to improve the private dairy work of the country. I cannot see how any person can be content to run a factory now without the use of the Babcock test. We find that some people will be dishonest. It has been painful and sad to find that so many prosecutions were necessary and that so many convictions were obtained. I think it is the meanest form of dishonesty, this of stealing a little from the milk. We frequently found factories producing very inferior quality of cheese notwithstanding all the tests applied and notwithstanding that they were managed by careful and skilful men, and for a time we had difficulty in understanding it. Before this test was introduced the milk of one factory was tested with complicated but efficient German instruments which showed the butter-fats in the milk were only $2\frac{1}{2}$ per cent. The following day, when it was known that the test had been made it rose to $3\frac{1}{2}$. The reports of the inspectors will be submitted to you. Also the report of Mr. Bell of his work in the experimental station at Tavistock. Mr. Bell conducted a series of experiments which have resulted in proving that payment according to the quantity of butter-fat contained in the milk is a fair and equitable system and giving good reason to hope that this plan will be adopted at no distant day. Everyone has felt the injustice of the old system of paying by weight regardless of quality, for a person supplying a superior quality of milk received just the same as one who supplied a poor quality. We can never have good cheese until we have a supply of

good, pure milk. The prevalent idea some time ago was that you could not incorporate the fat of milk beyond a certain richness, and thus there would be a waste of butter-fat in the whey. But by the Babcock test you can examine the whey for butter-fats. We have found no difference as between the whey of milk at 4 per cent. and that at 3.40. Paying according to the percentage of fat has been adopted in some districts, especially in Wisconsin. I have heard of one factory in Ontario that has adopted it. A factory distinguished for the high quality of its goods, the Elma factory, adopted a resolution which no others have seen fit to adopt as yet, that hereafter their patrons shall be paid according to the quantity of butter in the milk. I do not know how better to get over the difficulty of adulteration or how better to promote the production of a class of animals giving a superior quality of milk. Heretofore dairymen have had only quantity, and not quality. You may remember something I said about the quality of cheese I saw in Scotland. The extra butter-fat contained in the milk of which this cheese was made accounted for its greater richness. They received 15 shillings a cwt. for it more than was paid for our cheese. I am sorry that some of those whom we expected to attend this meeting will be unable to attend. We will all miss our old friend Prof. Robertson. In his place I am glad to say we have Prof. Saunders, the Director of the Experimental Farm. Another old friend whom I have known for years, ex-Governor Hoard also has an engagement which will prevent him from attending. From Hon. Mr. Adams who was with us a year ago, we have just received a telegram, "Unable to come. Detained by illness." As you will remember, on questions of breeding and feeding, though not so much upon the technicalities of cheese-making, he is a very valuable man. We shall thus be confined to our own people, though we shall probably be able to agree with the old woman who said that "Homespun linen was aye the best." I have always felt, and I think I voice the sentiments of all here when I say, that hitherto we have had in these meetings too many papers and too little discussion. I hope we shall have a profitable discussion. The attendance is not so large as I have seen it. The railway facilities are not so good as on the main line. But we are carrying the gospel to the heathen by coming to a district in which dairying is not so extensively carried on as in some others. The city of Brantford has done all in its power to make our meeting pleasant and successful. In no place where the Convention has been held have we received such a hearty welcome as from the municipal authorities of Brantford. They have spent $100 in advertising the meeting and have placed this fine hall at our service. I expect that we shall have a large attendance of those in the neighborhood, and I hope the meeting will be both profitable and instructive. No association that exists to-day has done so much for Canada as the Dairymen's Association. We have been going on from year to year holding profitable meetings, and I trust that on this occasion we shall be equally successful, notwithstanding the absence of the distinguished visitors whom we had expected here to-day. When the Association was first formed, we were dependent almost exclusively upon friends from the other side of the line, particularly; in fact almost altogether, those from New York State. It was there the cheese factory was first established and we looked to them for information. But we are not now in that position. As far as practical results are concerned, as far as quality is concerned, we occupy a position altogether ahead of them. I have much pleasure in introducing to you now Prof. Saunders, who will address you upon the work of the experimental farms in relation to the dairy industry.

EXPERIMENTAL FARMS AND DAIRYING.

Prof. SAUNDERS.—Mr. Chairman, ladies and gentlemen: I can assure you it affords me great gratification to be with you to-day, and to have the privilege of speaking to so large a number of those who are interested in an industry that has done so much for Canada as the dairy industry. I think this Association holds a proud position, as it can claim as the outcome of its work the building up of an industry whose product helps more than any other single article to swell the exports of the Dominion. We all know that Canadian cheese is highly esteemed in England. It is esteemed because of its good

quality, which is the result largely of the annual gathering of your Association and the discussions that have taken place and the information that has been disseminated at these meetings. The question of quality is of the first importance, especially in products of this kind sent to the Old Country. You wisely established the rule at the outset that only the best cheese should be exported, and the examining board at Montreal persistently ruled out as unsuitable all the lower grades of the article. While this Association has done a great deal for this industry, it will not, in my opinion, have fulfilled its mission entirely until it raises the standard of cheese production so that we shall have no culls left at home, and until not only in Western Ontario, but throughout the whole of Canada, the cheese product shall have been raised to that quality which will grade first-class in the English market. With regard to the other great dairy product, butter, we cannot as yet speak so encouragingly. While in cheese we supply the people of Britain with nearly one-half their total import, the proportion of butter we send is very small. Britain imports about 216,000,000 pounds of butter, and, of that quantity, Canada suppplies about two and a half million pounds, not much more than one per cent. Here is a market open to us if we will take the trouble to apply the same principle that has made us so successful in the manufacture of cheese. That principle is co-operation. I understand that of our total product of cheese 95 to 98 per cent. is produced in factories, the remainder being the produce of private dairies. With butter the very reverse is the case. Only about five per cent., or from that to ten per cent. of the butter of this country is made in creameries. The English people will not buy bad butter ; in fact it is a drug in the market anywhere. The country storekeeper who has to take it in, often against his will, finds it hard to dispose of. But if it is well made there is no difficulty in disposing of unlimited quantities. Before entering further upon this subject permit me to offer to the Association an apology from the honorable the Minister of Agriculture, whose name is on your programme, and who would willingly have been with you to-day had circumstances permitted. He desired me to assure you of the warm interest he takes in the work you are carrying on, and to convey his best wishes that your meeting would be a pleasant and successful one. I occupy a very responsible position on this occasion, being here to fill the place of my friend Prof. Robertson, whom you all know to be a strong man in dairy work, and also to represent, in some feeble measure, the Minister of Agriculture. There are many topics outside the practical manufacture of butter and cheese that it would be perfectly proper to discuss before such an assembly as this. The animals from which you derive your products take their food in the form of plants. These plants again take their nourishment from the soil, and the stores of fertility laid up in the soil is a subject which it would be quite in place to discuss before such a meeting as this. We might discuss also suitable fodder plants. You will hear more on this subject from my colleague, Mr. James Fletcher, who will talk to you to morrow about some of the grasses we have been experimenting with. The coarse grains might also come in for a share of our attention. Another item is good, sound seed, for there is nothing, to my mind, apart from the peculiarities of the season, that tends so much to interfere with a good crop as inferior seed. Most of you who have studied the composition of a seed know that it is a germ surrounded by food which is used by the young plant until it is strong enough to take its supplies direct from the soil in which it grows. If the germ in the seed is surrounded by only two-thirds of the food necessary to a strong, rapid growth, it cannot be expected to produce a plant that will maintain its growth as well as one from good seed. Another important item is the introduction from time to time of such new varieties of grain as promise to be more productive than those which the farmer is growing. As we all know, varieties run out, notwithstanding all the care that may be taken of them, and they require replacing. Another subject well worthy of study in connection with this industry is the best combinations of feed for producing milk, and the best for producing beef. It pays well to look after the stock in such a way that they will be kept in a good state of health, and thus be in a condition to serve you to the best advantage. The ventilation of barns is a subject worthy of consideration, also the providing of an abundant supply of pure water. From our experience at the Experimental Farm where our chemist has examined many samples of water for farmers, we believe that where the sources of the supply are impure it is not to be expected that good milk will be obtained. I mention

these points merely to show that the field is a wide one, and also to say that this field and much more is being covered by the work of the Experimental Farms of the Dominion and the Experimental Farm of the Province, and that these institutions bring together from year to year a mass of useful facts which, I believe, will be of the greatest use in future to the farmers of this country. These establishments are organised in your interest to furnish you with the information which will make your work more remunerative. I will add to these points that I have presented to you some considerations respecting the animals themselves. The differences between cows of the same breed, the differences between the breeds and the grades from these breeds, and the quantity of milk they yield, as well as the quality, are all questions of much importance. The average cow in Ontario, which I suppose is better than the average of the Dominion, falls far short in the quantity of milk she gives of what she ought to do. From 3,000 to 4,000 pounds of milk a year is about what is set down as the product of the average Ontario cow. If the system which has been so ably set forth by some of the previous speakers, that of having our cows milk for ten or ten and a half months in the year, could be made general, it would result in an enormously increased production. Most of the habits of animals become hereditary after a time, and if this long milking tendency was once firmly established, it would appear in the future generations to a very considerable extent. In carrying on the work at the Experimental Farm at Ottawa we have observed peculiar changes even in the same animal under the same treatment. We have noticed a difference in one or two instances in the quality of the milk of the same cow under the same conditions as to food and other treatment of from two and a half to four per cent. This shows that the quality of the milk depends upon the healthy condition of the animal, as well as on other circumstances which it is difficult for us to explain. That these differences in the proportion of butter-fat exist is proved by the Babcock tester, which is all that your President stated it to be, the most convenient, easily-understood instrument whereby the amount of butter-fat in milk may be determined, thus doing away, as your worthy President has said, with the necessity for the system of inspection with its unpleasant prosecutions. Cows are machines for the transformation of the coarser foods into useful products, and therefore it is wise for us to study them carefully in order that we may select those animals which give us profit, and reject those that are unprofitable.

I wish now briefly to notice the system of Experimental Farms organised under the Department of Agriculture for the Dominion, a system which has been organised and built up within five years These Farms are five in number, the object being to cover, as far as practicable, the principal settled districts of the Dominion, in order to furnish the farmers of those districts with information needed to enable them to carry on their work profitably. The Eastern Farm, which serves the purposes of the Maritime Provinces, has been located near the boundary between Nova Scotia and New Brunswick, in Cumberland County, directly opposite Prince Edward Island, where the conditions of climate are as representative as it is possible to get them. At this Farm located at Nappan, N. S., there has been introduced milking strains of Ayrshires, Holsteins and Shorthorns, and the male animals also are being used to improve the stock of the district. No special dairy work has been carried on at that farm as yet, but some very useful experiments are being conducted with the food products which are of special value to those districts, such as the marsh hay, which is cut from the dyke lands, and is extensively used by the dairymen and stockmen in the Maritime Provinces. At Ottawa we have Jerseys, Ayrshires, Holsteins, Durhams, Devons and what are called Quebec Jerseys. These are the descendants of the original stock brought to this country from Normandy by the French settlers in the early history of Quebec. From the Normandy cows of that period have since sprung the Jerseys and Guernseys, and in these Quebec cattle which have been selected from those districts where it is believed there has been no importation of foreign blood, it is believed we have the foundation upon which has been built the excellent breeds to which I have referred. The Quebec cow, for the quantity of food she eats, will produce probably quite as much milk as any other breed, and the milk will average a little

richer than that of the grade cattle of Ontario. Careful tests are now being carried on to determine the value of different sorts of food to ascertain which will give the best results in quantity and quality of milk. Experiments are also being carried on in the feeding of steers, so as to determine the cost of adding to the weight of these steers at different ages and under different circumstances. A working dairy is in full operation, and all sorts of tests are being applied to ascertain the most profitable methods of handling milk. A useful adjunct to the dairy is the piggery, where experiments are being made to find the cheapest way of producing pork with the different breeds of pigs and their various grades. At Brandon, in Manitoba, we have Shorthorns, Ayrshires and Holsteins, the same breeds as at Nappan. Similar animals have been sent to Indian Head, in the North-west Territories, where there is another Experimental Farm, nearly 200 miles west of Brandon on the plains. At these farms experiments are being made with different fodder plants and with coarse grains to find the most economical methods of producing milk and flesh. In Manitoba and the North-west the one problem which seemed a short time ago to stand in the way of the dairy industry was that of providing winter food for stock. In the early settlement of the country there were to be found everywhere tracts of unoccupied land which produced an abundance of hay, so that all the farmer had to do was to go out and cut and stack his hay, and in the winter draw it in for his stock. But as settlement became more dense these lands were taken up, and recently I have heard of farmers who have had to drive thirty and even fifty miles for their hay. This was a great bar to the dairy industry, an obstacle which it was necessary to overcome. By the experiments which have been made on the Experimental Farms it has been shown that it is possible to grow from three or four tons of cured hay by sowing mixtures of grain in the spring and cutting them during the summer while in the green state. The most successful of these have been mixtures of oats, barley and peas, or oats, barley and tares. By sowing a bushel of each of these to the acre, from ten to eleven tons of green fodder has been obtained, which, on being dried has given in some instances four full tons of hay. One of the advantages of these crops to the Western farmer is that he can sow them after his other grain is in and can harvest them before his crops are ready to cut. The Experimental Farms, in demonstrating this one point, have conferred a great benefit upon that country. At Agassiz is located the Farm for the Coast climate of British Columbia. The only breed of cattle sent there yet is Shorthorn. The accommodation there is not sufficient yet to admit of other breeds, but a large barn is being built which it is expected will be finished by the end of June, which will give the space needed, and then it is intended to add the Ayrshires, Holsteins and Jerseys, so that the necessary animals may be available not only for experimental work but also for the improvement of the stock of the country. Having thus briefly outlined the Experimental Farm system, I will call your attention to some of the special work which has been and is being carried on under the supervision of the Dairy Commissioner of the Dominion. Last year a scheme was formulated for carrying on dairy instruction throughout the Dominion by special dairy experts. Seven of these instructors have been employed during the past year, two in Ontario, one in the east and one in the west; one in Quebec, two in the Maritime Provinces, and two in Manitoba and the North-West. These instructors have, wherever possible, been located in some factory in the district where the dairy industry was most developed. They have remained at that factory a month or more or as long as was necessary to accomplish all the good they could. While there, it was advertised that they were prepared to give instruction in cheese and butter making, and the best appliances were supplied to carry on the work. After remaining as long as was necessary, the instructor moved on to another point, and by this itinerant plan a large proportion of the dairy districts have been covered and much useful information given to the people. In some of the districts of Quebec, as a result of this work, there is already a difference of a cent a pound in the price the people obtain for their cheese, for the reason that the quality has been so much improved. After the season's work was completed, which was some time in July, three of the gentlemen who had been employed as instructors were selected to carry on special experimental work, two at factories in Ontario and one in Quebec. The first line of work

was to determine, if possible, what difference arose in the manufacture of cheese where the proportion of rennet was varied. Extract of rennet of the standard strength was taken for this purpose, and it was added to the milk in the proportion of 2, 4 and 6 parts to the thousand, and 3, 6 and 9 parts to the thousand. The difference in the quality of the product was scarcely perceptible, but when milk was brought to the factory in an over-ripe condition, a decided advantage was found to result from the use of a large proportion of rennet. The more important work of these stations, however, was to endeavor to determine the quality and quantity of cheese made from milk with different percentages of butter fat. Beginning with milk of not less than three per cent. of fat, every increase of two-tenths of one per cent. of fat was found to yield three-tenths of one pound of cheese for every 100 pounds of milk. The product is also of a better quality when made from the richer milk. Experiments have also been carried on at Ottawa in relation to the setting of milk. The advantages in the use of the centrifugal separator have already been explained. In setting the milk under the best conditions possible you will have an average of one-half per cent. of butter-fat left in the skim milk, but with the separator the proportion left in the skim milk is seldom more than about one-tenth of one per cent. That will make a difference in favor of the separator of about ten per cent. in the production of butter. In the experiments referred to the milk was set at different temperatures, 78°, 88° and 98° Fahr. The cows also were separated into three groups, the first being those that had calved within two months, the second those that had calved between two and six months, and the third those that had calved more than six months. Cooling the milk in ice water at 38° it was found that the loss on the first group of butter-fat left in the milk after skimming was 10 per cent., in the second group the loss was 26 per cent., and in the third the loss was 34 per cent. When the milk was re-heated and set in ice water at 38, the loss on the first group was 14, on the second 29, and on the third 41 per cent. These are the average results of tests repeated not less than twelve times. Prof. Robertson tells me that it is not unusual for farmers who wish to save the price of special pans for setting their milk, to use the factory milk-cans in which milk is taken to the cheese factories. The loss from using these cans as compared with the shot gun cans was seven per cent., so that there is no economy in the use of such vessels where the butter is made at home. As you have already been told, two creameries have been organized under Prof. Robertson's supervision. One of these is at Mount Elgin, where the milk is taken, and the other is at Woodstock, of which Mr. Ruddick has given you an account, where the plan of collecting the cream has been adopted. At Mount Elgin the patrons were until recently supplying from 7,000 to 9,000 pounds of milk per day, and the butter product has run from 350 to 400 pounds per day. Shortly after November, when the factory began work, four per cent. was about the average of butter-fat in the milk, but later on it increased gradually to about four and three-fourths per cent., and that is about the percentage obtained now. The milk has been paid for in proportion to the butter-fat it contained. In that factory a charge is made of three cents a pound to cover the cost of making and marketing the butter, and at the end of the month each patron receives an advance of fifteen cents a pound for the butter contained in the milk which he has brought. It is thought that two cents a pound will be a liberal allowance to cover cost of transportation and commissions, and, as Prof. Robertson thinks, the butter will realise about twenty-seven cents, there will, if he is correct, be twenty-two cents for the patrons, which, at the present yield, will be equal to $1.10 per hundred pounds of milk. The quality of this butter, Prof. Robertson says on examination, is first-class in every respect, and equal, he thinks, to the best Danish butter on the English market. Some special packages are being made, and the first shipment will take place next week to practically test the value of our creamery butter in England, and determine what it is likely to bring. Following that shipment it is expected that others will be made to different markets in England; some of the cities in Scotland will also be tried, and the results published, so that those interested in creameries may know which are likely to prove the best points for the shipment of Canadian butter. The markets of other countries will also be tested as soon as circumstances will allow, but it was thought best at first to try the English market in this way, as it will afford, in the meantime, the best comparative test that could be made between Cana

dian butter and that of other countries. It is proposed another season to make shipments to Japan, China, the West Indies and probably several of the South American countries. But as Britain uses nearly one hundred times as much butter as we now send there is plenty of room for developing a market there. As showing the interest taken in these matters by cheese-makers, I may say that during the past few weeks Prof Robertson has received a large number of letters enquiring how they can best change their factories so as to use them for butter-making in the winter and cheese in the summer. There are also seldom less than from three to six cheese-makers at Mount Elgin taking instruction in butter-making. One of these has come from Quebec and two or three from New Brunswick. They come at their own cost for the purpose of preparing themselves to carry on this work next winter. As to the Woodstock creamery, you have heard the system described by Mr. Ruddick. The average quantity of butter made up to about the middle of December was from 200 to 275 pounds a day. Since then there has been a falling off. It is now about 700 pounds a week. When the creamery was started it was expected that early in January the supply of milk would give out. But the effect of the good results obtained has been to stimulate the farmers so that they have fed their cows better, and the flow of milk has been well maintained. The people are satisfied with the profit they are making. They get a higher price for their butter, get their skim milk returned, and they have less labor, a change which the farmers' wives, who are an exceedingly hard-working class, will appreciate. In addition to the advantages I have named, there is another attached to the winter-dairying system, and that is that by bringing in the cows to calve in the autumn; the young stock are reared so much better in the winter and are turned out in the right condition to be built up in the summer months. If this system of co-operative dairying can be established and butter made in the winter when it will bring the highest price, it will greatly improve the condition of the dairyman and the farmer, and will add fresh laurels to those you have already won as an Association. We are endeavoring to help you to work toward that end, and I sincerely hope you will look upon the Experimental Farm and its officers as your helpers. The information we get we hold at your command, and we shall be glad at all times to send you the reports of our work and other information whenever you ask.

The PRESIDENT.—We have farmers who are making a business of dairy farming, and in order to obtain the best results they must combine cheese-making with butter-making. Formerly a factory was supposed to be devoted either to butter or to cheese. It will take time to establish the new system, but I am satisfied that the largest remuneration can only be obtained by having a percentage—and probably a large percentage—of the cows calved in the fall, and make butter in the winter at the time when you can make the best butter, when it can be best shipped and when the highest price can be obtained for it. This is the third season in which I have manufactured butter in the winter and sent it to Toronto, receiving 25 cents a pound. Another point is that a cow will give a much larger quantity of milk in a period of say ten, eleven or twelve months when she calves in the fall than when she calves in the summer. In my own dairy the milk of every cow is weighed regularly. On the 4th November, 1890, we commenced to weigh the milk of one cow that had calved in the fall, and the result was a record of 12,415 pounds of milk in one year. I am satisfied that the same cow, if she calved in the spring and milked for the same length of time, would probably not have given more than two-thirds of that quantity. If you have proper stabling, and that is a necessary thing, when the spring comes the grass is a change for the cows and they milk about as well as newly calved cows. The experiments that these gentlemen are making are of the very greatest importance, and, as a result, we may look for very general improvement throughout the country. It is only where they have large herds that the whole milk can be hauled to the factory. Mount Elgin is probably more favorably situated in that respect than most places. The other system, though the result in production is not so large, has other advantages. The cream can be separated at the farm, the hauling can be done two or three times a week and is less expensive.

Prof. SAUNDERS.—I had intended to say when on my feet that it was Prof. Robertson's intention to establish next season a central butter station, where the butter will be made by an experienced maker, and to establish around this five or six stations where a separator will be used, so as to overcome the difficulty, which is a formidable one, of carrying the whole milk. These separators are getting cheaper all the time, and the saving of ten per cent. in cream will soon cover the expense. At the central factory a good butter maker can turn out from 1,500 to 2,000 pounds of fine butter per day.

The PRESIDENT.—That would do no doubt as far as the experimental station is concerned, but it would be impossible to so far extend the operation of the co-operative system as to have it generally adopted. We do not expect the Government to go into the business of butter manufacturing but simply to carry on experiments and furnish us information.

Prof. SAUNDERS.—The Government has only the privilege of meeting the loss, if there be any, and I do not suppose the farmers will object to these experiments upon that basis.

The PRESIDENT.—I only say that it is an experiment, but that though it may succeed as an experiment we cannot adapt the co-operative system to the establishment of these stations.

Prof. SAUNDERS.—That must be determined by the people. If within a radius of twenty or thirty miles, five or six stations can be established with advantage, the difficulties in the way will not be insuperable. Our object is simply to gain the information and present it to the farmers, leaving them to carry on the work. The charge made to the patrons, as is quite reasonable, will be sufficient to cover the cost of carrying on the work.

Mr. STEINHOFF.—A great many farmers have taken to getting deep-setting cans for dairy purposes. Do you prefer the deep-setting or the shallow-setting method?

Prof. SAUNDERS.—I thought I had made that clear. The experiments with setting in shallow pans showed that that pan yielded the best results obtainable by the deep-setting method.

Mr. RUDDICK.—If the temperature was the same, the shallow pan would have the advantage, because the cream has a shorter distance to travel to reach the surface.

The PRESIDENT.—This question, as between deep setting and shallow setting, has been completely tested, and wherever butter-making is a specialty and the centrifuge cannot be used, the deep-setting cans are almost exclusively used.

A MEMBER.—Which are the best cows, Holsteins, Jerseys or Ayrshires?

Prof. SAUNDERS.—That would be a still more difficult question to answer, and I would be sorry to lay down any rule regarding it. They all have their good points. If a man wants a breed of cattle from which to get milk for use in a city, either directly or in the form of butter, the Jerseys or Guernseys, or the Quebec Jerseys would probably be the best. Under other circumstances other breeds have the advantage in their favor. There is also often quite as much difference between the individuals of the same breed as between the average of two breeds. We have had two Jerseys which were kept side by side and treated alike, yet one gave about two per cent. of butter fat more than her comrade. Then there is a great difference in the feed required. All these things make it impossible to say generally which is the best breed. Each farmer must consider his own circumstances and what he requires of his cows, and buy accordingly.

Mr. DIXON (Aylmer).—Is the Babcock test accurate to your knowledge?

Prof. SAUNDERS.—We have had the results submitted to careful chemical analysis by our chemist, Mr. Shutt. The greatest difference found between the elaborate chemical analysis and the comparatively ready method of the Babcock test was one-tenth of one per cent., so that it may be considered practically perfect.

Mr. T. J. WADDELL.—Have there been any experiments made in reference to the other solids in milk and their effect upon the yield of cheese?

Prof. SAUNDERS.—That has not been gone into. It is to be taken up as soon as possible, as it is believed, to be a very important question.

Mr. HARFORD ASHLEY.—Prof. Robertson gave me some explanations on that subject which chese-makers will understand. He said that the more oil or butter-fat that was in the cheese, the more water might safely be left. Thus rich milk in the making of cheese is a direct advantage. More than that, cheese made of milk containing 4 per cent. of butter-fat would bring $\frac{3}{8}$ cents more per pound in the English market than that made of milk at 3 per cent. On these grounds he held that it was as reasonable for the cheese factory to pay the farmer for the butter-fat in his milk as for the creamery to do so. As Governor Hoard said at one of the meetings in Wisconsin, "The Babcock test would make more and better Christians than the Bible." We find now that our Governments are ready to do something for the farmers, and if the farmers would wake up there would be still more money spent and more good done. Nothing is thought of $100,000 spent in deepening a harbor or digging a canal. But that benefits only one locality. Money spent in such matters as these dairying experiments benefits the whole country. I am glad to see the governments doing so much. Still, $2,000 for our Dairymen's Association is a mere bagatelle. It should be $10,000 or $20,000; then you would get all the larger benefits.

A MEMBER.—Are the Jerseys better for butter or for cheese?

Prof. SAUNDERS.—We have no experiments that furnish the answer to that question, for we have no facilities for making cheese. Nor do I know of any experiments to show on which side the advantages of any particular breed lie.

The PRESIDENT.—The Babcock test will answer that question. Wherever you find cows giving rich milk, there you find the cows that will make the best cheese. Regarding the question of leaving more moisture in the cheese, it is found that the cheese containing a larger percentage of fat does not dry up so quickly. Prof. Saunders referred to the Quebec Jersey. The probability is they have not been bred so carefully as those breeds that are best known to us, but they are of the same strain as some of the best milking breeds we have. I bought three in the neighborhood of Quebec and bred them to Jersey bulls, and found that they yielded very rich milk. There could be no better foundation for a dairy breed. They are very hardy and strong. I happened to be in England last October and the finest Canadian cheese I saw there was Quebec cheese, and from my experience of twenty-five years I concluded that the high quality was because of the percentage of butter fat in the cheese. That solves the question which is the best breed. Wherever you get cows producing a rich quality of milk, that is the best for cheese-making.

Mr. J. W. STEINHOFF.—But, considering that there are other solids that enter into the composition of cheese, is it fair to pay on the basis of butter fat alone?

Prof. SAUNDERS.—On milk of from three to four per cent. of butter-fat, you find that every increase of 2-10 of one per cent in the butter fat yields 3-10 of one pound of cheese for every hundred pounds of milk, showing that in some way the difference is manifested in the cheese. You may take it for granted that the Babcock test is a reliable guide for the payment of the patrons of the cheese factory as well as creamery.

EXPERIMENTS AT PERTH.

Mr. RUDDICK was called upon for another address. He said: I hardly feel competent to give two addresses before such a body as this in the same afternoon, but it might not be out of place if I go a little more into detail upon the subject of the experiments conducted this summer under Professor Robertson. The experiments were carried on in a cheese factory in Perth, in the county of Lanark. There was every facility for doing the work carefully and accurately. The milk was of a fair quality. Of course we had to encounter the usual difficulties. You have already heard the results of one and perhaps our main experiment. Another experiment was to determine the effect of early or

late milling of the curds, and another was to determine the effect of high and low piling. In this latter the result was altogether, on the average, in favor of piling the curd as against spreading it. Of course this experiment was not conducted for any great length of time, and the conditions of making were exactly the same in both cases. In the matter of milling the curd, we did not find that it made a great deal of difference except in the case where a little too much moisture had been left in the curd at the time of cutting, and then we found it best to mill the curd early. The temperature was maintained evenly in the curd in all cases, and we made careful notes of the results. Then we made some experiments in the way of different degrees of ripeness. I do not know how it is in this western part, but I know there they had carried this matter of ripening a little too far. Cheese-makers got the idea that ripening it well hurried them through with their work, and so they ripened it to a degree of acid that we would not have dared to approach a few years ago. I made another test which perhaps does not apply so much in this section. It was done to supply information for the local cheese-makers. A number had been using the rennet powder, and the claim had been set up for it by agents and others, that it would make considerably more cheese than liquid rennet, and I was asked by several of the cheese-makers to make a comparison. I made the comparison with the result that very little difference was shown, but such as there was was in favor of the liquid extract. I also made some experiments as to the time when the curd should be put to press. The evidence was in favor of hooping immediately after grinding, that is it would be ten minutes or so, as soon as you could get round to it after salting. I do not pretend to have greater capability in reference to cheese-making than others, but I have had special advantages for gaining information, and I would be only too glad if I could in any way further the discussion upon these points. I would be glad to answer any questions on subjects within my knowledge.

A Voice.—What percentage of butter fat did you find in the whey?

Mr. Ruddick.—About 2-10 of 1 per cent. Sometimes it went a little more; occasionally a little less. Just here let me say, contrary to what I have heard expressed sometimes, that in making the test we found very often a rich milk gave a less percentage of butter fat in the whey than poorer milk.

Mr. Steinhoff.—Was there any difference in the amount of fat in the whey arising from the quantity of rennet?

Mr. Ruddick.—I could not find that there was any appreciable difference. The average was slightly in favor of a large quantity of rennet, but the difference was very small indeed.

A Voice.—Do you find any difference in different rennets?

Mr. Ruddick.—I only used one brand of liquid extract, and I think it was Hansen's. When I went to the factory there was some rennet that had rather an objectionable smell, so I had them send to the dealer and got some extract done up in glass bottles. This was certainly a nice article, and we got good results from it. Afterwards I tried the other and found that it made no particular difference, and I afterwards came to the conclusion that the flavor was from the wood that the rennet was encased in. I say this because sometimes you might get rennet that you would think was not right when the difficulty would only be in the packing. Another point while I think of it. I went into the province of Quebec this summer and found that the great cry there was that it was difficult to get the curd firm, to get the moisture out of it, and the cheese-makers from Ontario did not get along well for that reason. I said nothing, but when I went to work in the morning I found that their curd knives were very coarse, much coarser than the average used in Ontario. I telegraphed for another set of knives, and on using them found all the difference in the world.

ORDER OF BUSINESS.

The president appointed the following committee on the order of business; Messrs. James A. Gray, Atwood; A. F. McLaren, Stratford; J. S. Pearce, London; George Hately, Brantford, and — McLean.

The convention then adjourned until 9.30 o'clock to-morrow morning.

SECOND DAY.

The President presented the report of the Committee on the Order of Business, which was adopted.

NOMINATIONS.

The following Committee on Nominations was appointed, on motion of Mr. Messer, seconded by Mr. Prain: Messrs. George Hately, Brantford; Ballantyne, Harlin and William Dickson, Atwood.

The PRESIDENT.—I have now much pleasure in calling upon Professor Dean, of the Agricultural College, with whom most of you are familiar.

PROFESSOR DEAN'S EXPERIMENTS.

Prof. H. H. DEAN.—I feel it a pleasure and an honor to address the Western Dairymen's Association in the city of Brantford. As most of you know, this is my native city. There is an old saying that a prophet is not without honor save in his own country and among his own kin. Now with your permission I would like to say a few words in regard to a question that was discussed at the Eastern Dairymen's Association. That question was: Shall we pay for milk according to its quality? That was the most interesting question before that meeting. Their inspectors found the same state of things as the inspectors in the west did, if not worse. The reason for this state of affairs is that there is little encouragement for a man to send good milk. Suppose that one patron sends milk with three per cent of butter fat, and another milk with four per cent. Both are paid the same. Professor Robertson, whom most of you know as one of the best authorities in dairy matters in Canada or the United States, laid before that Convention some of the results of his experience last summer. He first showed the value of the water, the fat and the curd in the cheese. I have here a chart which shows the composition of cheese—about thirty-one per cent. of water, thirty-one per cent. of fat, thirty-one per cent. of curd and seven per cent. ash and other matter. Of course water in the cheese has no value in itself, but the argument of Prof. Robertson was that in conjunction with the fat and the curd it has a value. You would not dispute the fact that butter fat is the basis for paying for milk at creameries, because butter contains about eighty-four per cent. of butter-fat. It is not so in cheese, as the figures I have given show. Professor Robertson went on to show the results of some of his experiments in cheese-making. They divided a vat into three compartments, and in one placed milk which contained 3.86 per cent. of fat, in another milk containing 3.60 per. cent. and in the other milk containing 3.45 per cent. Now, the richest required 10.38 pounds of milk to make a pound of cheese. This was in July. The milk containing 3.60 per cent. required 10.84 pounds of milk to make a pound of cheese, while that containing 3.45 per cent. required 11.21 pounds to make a pound of cheese. Thus the rule that holds good with regard to butter is true also with regard to cheese. If I send milk that will make more cheese than that sent by my neighbor I am entitled to more money. The experiment showed that with between three and four per cent. of fat in milk every increase of 2-10 of 1 per cent. of fat in the milk would make 3-10 of a pound more of cheese. Another important point was this: Professor Robertson said he had sent these cheese to Britain. He had not yet received the returns from it, but he had placed the value something like this: for every increase of 2-10 of 1 per cent. of fat in the milk between 3 and 4 per cent., the cheese made was worth $\frac{1}{8}$ cent more per pound. Thus you see there is an increase not only in the amount of cheese from the richer milk, but also an increase in value. If further experiments corroborate this you will see how important it is that we should pay for milk according to its quality, not only at creameries but at cheese factories. The Babcock test has given universal satisfaction, as the inspectors have told you. Professor Dean went on to give an account of the Babcock test in connection

with the Travelling Dairy and also to set forth results of experiments to ascertain the percentage of butter-fat in the milk of cows in the morning and evening's milking. He proceeded: We had an institute meeting at H ——— and at the evening session I was told that a lady wished to see me. She had been accused of skimming milk or saving strippings, and had been prosecuted last summer. The charge was sustained, but it was carried to a higher Court and I think the decision of the magistrate was reversed. She looked like a thoroughly honest person, and I doubt if she were guilty. She said: "This case has cost us a lot of money that we could not afford to lose and besides it is a disgrace." I would just say here that I think the inspectors cannot be too careful in prosecuting, because whether innocent or guilty it is an everlasting disgrace to persons accused. Professor Robertson says he would rather see the whole business wiped out of existence than that it should be made the occasion of ruining any man's character. But if you pay for milk according to the quality there will be no temptation to tamper with the milk. Governor Hoard gave the result of his experience with his creamery at Fort Atkinson. He says he does not need to care what a man brings him as long as it is not dirt; if the man brings him skimmed milk he gives him skimmed milk pay. Not only would there be no temptation for patrons to tamper with the milk, but there would be a stimulus to people to breed better cattle and thus improve the quality of the product. I desire now to speak upon another branch of this subject. I have here a chart showing the average composition of new milk. It contains eighty-seven per cent. of water. Some people think that is not enough, and put in a little more. When we speak of the richness of milk we refer to the fat or butter. Some may not have seen pure butter-fat. Butter is not pure butter-fat. The average of butter-fat in milk is about three and three-quarters per cent. (The average of our testing last summer is a little higher—about four per cent. Some of these were samples taken from cows that gave rich milk. Wherever we went, we made it known that we would test the quality of milk, and in many places there was quite a strife as to who had the best cow. I am not sure that they always brought the correct sample, but am afraid that sometimes the last of the milking was brought, or a little cream was mixed in. When a man gets a little warm on a subject of that kind he would not think it much harm to take the sample from the last of the milking.) Besides fat and water, milk contains casein, albumen, sugar and ash, all of which have value as food. Now, the fat is the most important compound in the milk. If you make cheese out of skim milk it will not be worth much. The richness of milk varies with the breeds of cattle; some are noted for the richness of their milk, such as the Jerseys and Guernseys. The Holsteins and Ayrshires are not noted for giving such rich milk, but rather for the quantity they give. Then again, individual characteristics have much to do with this point. All animals of the same breed do not give the same quality of milk. Again, we find that the period of lactation has an influence on the quality of milk. At the Agricultural College we have six cows we have been testing ever since about the 10th March. Each cow had milked about fifty days when the test began. The average of these cows for the first ninety-one days was 3.49 per cent of fat, for the second ninety-one days 3.66 per cent, or a gain of .17, and for the third ninety-one days 3 95. If this is to be taken as conclusive, we do not find that the milk becomes so rich during advanced stages of lactation as we have been led to expect. Some of these cows had ceased milking at the end of the third period. There is a difference also in the morning's and the evening's milk; our cows give richer milk at night than in the morning. This is not always true, but we find it true on the average. The frequency of milking also has an effect. The oftener you milk the richer the milk will be. Then the first milk is not so rich as the strippings. All these things have an effect upon the composition of the milk. Now, what effect has food on the composition of the milk? That is a point we are trying to get at. You all know that food affects the quantity of milk; if you feed your cows well they will yield better. Some people have the idea that the richer the food the richer will be the milk, but I doubt if this be true beyond a certain point. I believe that you may get a cow up to a certain limit, and when you reach that limit you cannot make her give richer milk. At the College our average ration is 50 pounds of ensilage, 6 pounds of hay and 5 pounds of bran. Yet one of our cows will test six per cent., and we have one, I think, that tests about two and one-half per cent.

Some look pretty blank at me when I tell them that as a rule the cow that gives a large quantity gives a poor quality of milk. I want to lay before you the results of some of our experiments on that point. I must thank Mr. Rogers, my assistant, who has helped me greatly in my work, because if you have ever undertaken experimental work you will know that it is exceedingly difficult, and that unless you have a careful man who will look after the details minutely, the results cannot be said to amount to anything. We took six cows as nearly alike as we could get them and fed the following ration: Ration No. 1—ensilage 30 pounds, oat straw 20 pounds (we gave them all they could eat, but that was about the average), hay 10 pounds. Professor Cook, from the Vermont Experimental Station, came over while the experiment was going on. He said this was a starvation ration. The second ration was as follows: Linseed meal 4 pounds, cottonseed meal 5 pounds, hay 20 pounds. The hay was cut and put in the mangers, and the linseed and cottonseed meal mixed up through the hay. The third ration was: hay 20 pounds, pea meal 4 pounds, oatmeal 5 pounds, cornmeal 8 pounds. I was feeding a cow 17 pounds of meal a day, and it was eaten up quite clean. The plan of the experiment briefly was this: Two cows were fed for three weeks on ration No. 1, an then successively for similar periods of time upon No. 2 and No. 3. The average per cent of fat given by lot 1 on ration No. 1 was 3.49, on ration No. 2, 3.52, or practically the same, though changed from a "starvation ration" to a more generous one, and on this very rich ration of pea meal, oatmeal and cornmeal the average was 3.23 per cent. For all practical purposes we might say it was the same. Lot 2 on ration No. 1 averaged 3.99 per cent. Lot 3 on ration No. 1 gave 3.53 per cent. On No. 2, lot 2 gave milk averaging 3.49 per cent. The average of all the lots on ration No. 1 was 3.67 per cent. On ration No. 2 the average was 3.49 per cent., practically the same; and on ration No3, which you will remember was very rich, the average was 3.25 per cent. So far as this experiment goes, I should be led to the conclusion that the quality of food has little if any effect upon the quality of the milk when fed for a short period of time, say four weeks. Of course it has a great effect upon the quantity. It would perhaps be interesting to consider the sources of animal and milk fat, and on this subject I shall read you the opinions of some leading authorities.

Source of Animal Fat.

1. Animal fat may be formed from the fat of the food.
2. It may be formed from the protein of the food.
3. It may be formed from the carbohydrates of the food.

Lawes and Gilbert showed that for every 100 parts of fat in food there were stored up as animal fat 472 parts.

Old school physiologists taught that the manufacture of organic constituents was a power possessed by vegetables only. Liebig disproved this theory in the case of a cow on grass, proving that she made more fat than she could possibly obtain from the grass she ate. Do the same conclusions follow as to fat of milk?

Henry Stewart: "The fat, in the form of an emulsion or exceedingly intimate mixture, in particles so fine as to be invisible, is absorbed directly into the circulation and is carried on with the blood, to be deposited where the exigencies of the system require it. It is deposited in the tissues, or in masses in various parts of the body, and in females, at and after the birth of their young, is carried in large part to the udder, where it is first deposited in the glandular cells of the udder and is then mingled with the copious secretion known as milk. * * * In the practice of feeding, we are guided by two principles, viz., that certain products are composed of certain elements, and that if these elements are supplied to an animal, we may secure the desired products."

Armsby: "Experiments have shown that carnivorous animals, on a purely meat diet, produce normal milk, thus proving that milk-fat may be formed from albuminoids. Experiments on herbivorous animals have shown no necessity for the assumption of a formation of milk-fat from carbohydrates."

Source of Fat of Milk.

Dr. Foster: "All the evidence we possess goes to prove that the fat (of milk) is formed in the cell through a metabolism of the protoplasm. * * * Thus the quantity of fat present in milk is largely and directly increased by proteid; but not increased, on the contrary diminished, by fatty food."

Dr. SMITH: "The origin of the fat is, without doubt, in a process of fatty degeneration of the protoplasmic cell contents, for the amount of fat in milk, so far from being increased, is actually diminished by an increase of fat in the food; while, further, the fats in milk do not necessarily coincide in nature with the fats of the food. * * * A fatty diet may help the milk secretion, but not by an immediate transfer of the fat of the food to the milk."

EFFECT OF FOOD ON MILK.

"Let me repeat and emphasise the fact that breed and individual characteristics are the two great factors that determine the richness of milk. * * * By judicious or injudicious feeding the amount of milk daily may be very largely varied, but the quality of the product will be chiefly determined by the individuality of the cow. * * * Quantity is the result of food influence. Quality is the result of the make up of the animal."—Prof. WHITCHER, Bulletin 9, N. H. Station.

Dr. BABCOCK is quoted as saying: "I do not believe that the individual character of any animal, so far as it is manifested in the quality of milk, can be materially changed by the kind of food."

Bulletin 14, Iowa Station: "1. The kind of food had a decided and material effect upon the quality of milk produced, as regards percentage of fat and solids.* * * 2. Change of feed influenced the quality of milk considerably more than it did the quantity. 3. The ratio of fat to 'solids not fat' was considerably modified by feed."

Prof. E. W. STEWART, in Feeding Animals: "Since certain very partial experiments were made in Germany, * * * dairymen have been told to seek quality of milk in the breed and not in the food. We are always ready to admit and emphasise the value of breed, * * * but in philosophy and fact the quality and quantity of milk are as perfectly controlled by quality and quantity of food as are the quality and weight of flesh laid upon a stall-fed animal."

These are some of the opinions on the subject from the best authorities. I have given you the results of our own experiments.

I wish now to draw your attention very briefly to the effect of food upon the composition of butter, and to do this I shall give you the result of some of my own experiments upon the melting point of butter.

In summer time, as you know, it is a difficult matter to keep the butter firm. The reason is that there are certain fats in butter which melt at a low temperature, and these are present in greater quantities in summer than in winter. With ration No. 1, as I have given you, the melting point of the butter was 31.75° centigrade; with ration No. 2 (hay, linseed and cottonseed meal) the melting point was 34.62°, and with the third (peameal, cornmeal and oatmeal) the melting point was 33°. Professor James, who at that time was chemist at our Experimental Station, found that the melting point of the butter, where a mixture of linseed and cottonseed meals was fed, was not so high as other experimenters had found it where cottonseed meal alone was used. When cottonseed meal is fed it raises the melting point of the butter; that is to say, the butter is harder and firmer and will stand to be shipped a longer distance. We further continued our experiments and feeding hay and cottonseed meal, also a mixture of hay and linseed meal, and had two cows upon grass. The melting point of the butter from the cows upon grass was 32.3°, that of the cows on linseed meal 33°, and the cottonseed meal 36.5°.

FAT FED AND FAT RECOVERED IN MILK.

In ration No. 1 there were 5.18 pounds of fat fed in seven days, and we obtained from the cows 9.40 pounds of fat. In the winter ration there were 6.16 pounds of fat, and we obtained in the milk 15.94 pounds. Thus I come to the conclusion that some of the fat in the milk is made from something other than the fat contained in the food. I come to the conclusion also from the other experiments that for a short period of time and for such cows as we used, the quality of the milk is not affected materially by the quality of the food. It would seem also that the feeding of cottonseed meal has the effect of raising the melting point of butter and making it harder and firmer.

The PRESIDENT.—We have had an exceedingly able paper from Professor Dean on a comparatively new subject, and I have no doubt the Professor will be glad to answer any questions on the subject that are put to him.

Mr. J. N. PAGET.—Will the Babcock test be practicable as a means of ascertaining the quality of milk as received, in view of the time it takes to make the test, especially in warm weather?

Professor DEAN.—Yes. That question was asked Professor Robertson. He thought that if the tests were made twice a week that would be often enough, taking the samples from the milk as it is received.

A VOICE.—Would not the time that intervened between the milking of the cows and the receiving of the milk at the factory affect the butter-fat in the milk?

Professor DEAN.—I do not see why it should.

The PRESIDENT.—We have tested that thoroughly, and we find that it has no effect. Why should it?—the butter-fat has not been removed.

Mr. JAMES BUTCHART.—On which ration did you get the highest quantity of milk?

Professor DEAN.—On the ration of ensilage, bran and hay.

Mr. STEINHOFF.—Have you tested deep setting as against shallow setting?

Professor DEAN.—We have made some experiments. During the summer our dairy was not suitable for setting the milk in shallow pans. But during November we tested the shallow pan against the Cooley creamer. We found the result practically the same.

Mr. STEINHOFF.—Did you use the deep setting with ice?

Professor DEAN.—Yes, sir.

Mr. STEINHOFF.—I think this is a very important matter to the farmers, because where we are making they are getting in these deep setting pans. It saves work and some expense in the cost of utensils, but the saving will be a great deal more than balanced by the loss of butter-fat in the skim-milk.

A VOICE.—Were the cows in these experiments freshly milked?

Professor DEAN.—They had calved only a few weeks.

A VOICE.—That is the result you would naturally get. Where cows are milking eight or nine months you would not find so much difference. I think this deep setting is as far ahead of the shallow pans as the separator is ahead of the deep setting. If a farmer has fifteen cows, his best plan is to buy a separator. I could give you some of the results of our work recently, if it were necessary. We found that where we used the deep pails and the Cooley system, with plenty of ice, and took the best care we could, that the whey would leave five-tenths and six-tenths of one per cent. of fat.

Mr. ROGERS.—In no case, when using the separator, did we find more than one-quarter of one per cent. of fat, and in others from one-tenth of one per cent. and down even to a trace of fat. With the separator it makes no difference how long the cow has been milking. If I were running a dairy of ten cows I would have a separator.

Professor DEAN.—There is a point that Mr. Rogers has just called my attention to, and that is, that with the separator you must have the milk warm, which sometimes is not convenient. We only separate once a day. We bring in the night's milk and leave it in the dairy, and when the morning's milk is brought in we warm up that which has been standing and run all through together. It is some trouble also to get the machine oiled up, and one operation is saved, and separating once a day is just as good as twice.

INSPECTOR WADDELL'S REPORT.

Mr. President and Gentlemen: I herewith beg leave to submit my report as inspector and instructor for the season of 1891.

The district over which I was appointed included the counties of Elgin, Kent, Bothwell, Lambton and the western portion of Middlesex.

On my first trip I visited thirty factories and attended three cheese markets.

Out of the thirty factories visited I received applications from twenty. And I may say I received an application from nearly every factory that was doing any business of any account.

I received at the cheese markets and from other sources nine applications, making a total of twenty-nine factories in my district that applied for inspection.

Of these twenty-nine factories I visited one four times, eleven of them I visited three times and all of them I visited twice.

This is exclusive of the visits made on my first trip around.

I tested altogether 4,718 samples of milk, with the Babcock method I tested 2,784 samples, making total of 7,502 tests made. I visited 48 different patrons for the purpose of getting samples of milk as it came from the cows and obtained a sample in every case except one. This one refused to allow me to test his milk and of course had to suffer the penalty of the law for doing so.

I laid informations against 17 patrons and obtained a conviction in every case, one of which was appealed, and the appeal is not decided yet.

In the discharge of my duty I travelled by rail 946 miles, and by road 1,735 miles, making a total of 2,681 miles travelled.

I might say I was courteously received by the makers in every instance. I found them as a class anxious to improve and quite willing to benefit by any suggestions made to them.

I found a number of makers who did not realise the necessity of keeping their factories and surroundings as clean and tidy as they should have done. Some I found who kept them scrupulously clean. I found a great improvement in most cases on my second visit.

I found a few factories that were doing a good business, that were not fitted up as they required to be to manufacture the best quality of cheese. To save the outlay of a few dollars both buildings and utensils were badly out of repair.

One thing I have noticed particularly is that in almost every instance where I found a patron tampering with his milk he had very poor cows, cows that cost about twice as much to feed them for a year as all the return they gave. I would advise all patrons that have those kinds of cows to get rid of them, and thus a great temptation to be dishonest will be removed.

I don't mean to say that all patrons that have those cows are dishonest, but I have found that in some cases there was a temptation.

One man told me that he thought if he could not get 100 lbs. from five cows he had better quit sending milk to the factory. 100 lb was all he had at that time, in the month of July, and one-fifth of that was water.

In reference to carrying home whey in the cans I believe it would be a great benefit to the quality of our cheese if this practice could be abolished. But I am afraid it will be some time before that can be accomplished, although some are doing it and I hope others may follow their good example.

I believe that a great deal of our gassy curd is caused by the whey going into the milk cans out of dirty and very sour whey tanks, and in many cases standing in the cans all day, and then the cans are not thoroughly washed before the milk is put into them again.

I also find that the cheese makers can avoid a great deal of this by taking pains to keep their whey tanks clean and as sweet as possible. The tanks should be cleaned out two or three times a week, and the cream should be taken off the top every morning, so that none of it is allowed to enter the cans. I think if makers would be particular about this they would be fully repaid for their trouble by their milk working so much better, to say nothing about the extra quality and flavor of their cheese.

Then, too, I have found that a maker can accomplish a great deal by watching the milk closely as it is being weighed in and keeping a record of its quality, and when anything is found wrong let the patron know that his milk is not right, what is wrong with it and the remedy, and I would suggest when possible to do so that the maker see the patron personally, as a few minutes talk with a patron will do much more good than writing him a note as is done in some cases. I find a great many makers make a mistake in the curing of their fall cheese by allowing them to go too long without fire in their curing rooms.

I found factories in the latter end of October that had not set their stove up yet. A little fire should be put in the curing room as soon as the nights become cool enough to cause the temperature in the room to fall below 64 degrees, as it is very detrimental to new cheese to allow them to become chilled.

I would urge upon factory men the necessity of getting a Babcock machine for use in every factory. Some claim that their patrons are all honest and it is not necessary, but I am of opinion from the experience I have had that there are very few factories where there are not a few patrons who take at least a little cream for their tea.

In reference to instruction I found my time very much limited, so much so that I could not give this part of my duty nearly the attention I would have liked. It very often kept me very busy to get the samples all tested and my bottles cleaned and put away in time to drive five or six miles for the purpose of seeing a delinquent patron's cows milked.

In conclusion I would take this opportunity of thanking all makers and proprietors and others with whom I came in contact in the discharge of my duty for the friendliness shown me, a total stranger to nearly all, on every occasion.

WM. WADDELL.

INSPECTOR WILLIAMS' REPORT.

Mr. President and Gentlemen: The executive committee of your Association appointed me inspector the past season for the county of Oxford and parts of Middlesex and Elgin counties. I commenced my duties on the 1st of June. The first two weeks were occupied in showing factory men the instruments we were to use, as many had lost faith in the old instruments and were slow in making application for an inspector. Finding that we had reliable instruments the following made application for inspection, also the number of visits made to each:—Avon, 2; Brownsville, 2; Burnside, 2; Bright, 2; Bayham, 2; Blandshard, and Nissouri, 2; Culloden, 2; Cherry Hill, 2; Dorchester Station, 2; Devizes, 1; Dereham and Norwich Union, 1; East Zorra and Blandford, 2; East Nissouri, 2; Firby's, 2; Gladstone, 2; Geary's, 2; Harrietsville, 2; Lawsons, 2; Lakeside, 1; Murray's, 2; Mt. Elgin, 2; Mapleton, 2; Northwood, 2; North Oxford, 3; North Branch, 2; Prouse's, 2; Red Star, 2; Thames, 3; Thamesford, 2; Tilsonburg 2, ; West Oxford, 3.

I commenced testing the milk on the 16th of June and from that to the end of October I tested four thousand three hundred and fifty-three samples, two thousand eight hundred and eighty-one by the Babcock test. I found thirty- five samples showing less than three per cent. butter fat.

After testing the milk, direct from the cows and securing the necessary evidence, I laid informations and secured a conviction in fifteen cases. In addition to these one patron paid a fine to the factory and two were expelled and not allowed to send milk any longer.

I found one sample showing as low as 1.50 per cent. butter-fat and the highest was six per cent. butter-fat.

A comparatively limited number of samples, if any, of honest milk are found as low as three per cent. fat during any portion of the season.

The inclination of factory men generally was to have the guilty punished, particularly if they had nothing to do with it themselves; while a few on account of the strong competition among factories were included to let the offenders off with a warning.

Cheese-makers have told me, and I have so found it myself, that after a few prosecutions, and the names were published in the papers, some patrons who never could get their cows to give rich milk began to do so.

The Babcock test truly is a wonderful food to raise the quality of the milk of delinquent herds which have a fondness for cheating their masters.

Since the factories have closed, I have tested a few samples of skim milk and find them leaving nine-tenths of one per cent. butter fat in the milk, and a greater amount in their butter milk, showing quite a loss in their methods of setting and churning their milk.

The attention of milk producers cannot be too often called to the importance of adopting a proper system for the aeration of their milk. I have noticed at some factories where milk is delivered by the patrons themselves, from large herds, that it is too often of very bad flavor, and has every appearance of being very badly cared for. It is hurried to the factory for fear of loss by souring.

I was glad to find that greater attention was given by a few cheese-makers and factory owners to the cleanliness of the whey tanks. I induced a few makers to clean their tanks and they reported much less gassy milk. There is still much room for improvement in this particular. Clean whey tanks will increase the feeding value of the whey, as well as assist in securing clean milk cans. The tanks should be washed and scalded at least once a week. If the whey is to go home in the cans it should go in the best possible condition.

The bad flavor in many cheese may be traced to dirty sour whey tanks.

Of the thirty-one factories I have visited, the majority of them may be classed as clean and well kept, others not as clean as should be, while a few are exceedingly dirty.

In calling the attention of cheese-makers to this matter, they complain that they do not receive sufficient remuneration to employ the necessary help to keep their factories in proper condition.

While there are some factory owners still reducing the rate per hundred given their makers, it is gratifying to find that a few deserving ones will have their pay increased for the coming season.

Of the factories I have visited twenty-five have good water. In nine the water comes from springs flowing into the factory. A few have wells so situated that the soakage from underneath and around the factory filters into the wells and spoils the water. To this cause can be traced not a few of the bad flavored cheese of past seasons. As the water comes in contact with everything in connection with the manufacture of cheese a plentiful and pure supply is an absolute necessity.

In too many instances cheese-makers do not give sufficient attention to the style and finish of their cheese. They are pressed too quickly; bandages not properly arranged; head cloth not nicely put on; irregular in size; crooked, with shoulders; checkered and dirty in appearance.

The condition of a few of the making houses are not at all suitable for the purpose for which they are used. They are too small, poorly constructed, cold and impossible to keep clean. The floors are not kept in proper condition, allowed to decay and not repaired when needed. Even the best making-rooms would be the better of an annual coat of whitewash; and the vats, curd sinks, hoops and presses a coat of paint; and black japan for steam-pipes, water-pipes and all iron about presses, etc.

The drainage at most of the factories visited by me was very good; some of them were natural, others artificial, all could be improved and the precincts sweetened by thorough artificial drainage.

Too many cheese-makers do not take sufficient care in selecting their thermometers; very often there will be one about the factory, and that may be a number of degrees out. It is necessary to have reliable thermometers in the curing room, as well as the making room. Cheese should continue curing from the hoop to the finish, and there stop. If allowed to cure too fast or too slow the result will be unsatisfactory. Without a reliable thermometer, a cheese-maker cannot secure satisfactory results to his labor.

It is to be regretted that an effort is not made by factory owners to put their curing rooms in better condition; in a condition that the temperature of the outside of it will not so easily rule that of the inside. If they were so constructed that the temperature could be controlled at all times, much better results could be expected in the quality of the cheese made. As they are, makers in the summer must make a cheese that will stand the heat, and in the fall a cheese that will stand the cold, which is a rather difficult matter to do. Control the temperature of the curing room; do away with gassy milk, and then there will be less complaint about dry, hard cheese.

The work of boxing the cheese properly is to the makers like airing the milk to the patron. In too many cases it is very difficult to get them to understand that it is in their interest to do the work carefully and well. It is the finished article in both instances, and without skill in the finish will not result in profit.

The time has come when cheese-makers and factory owners should give a little attention to the grounds surrounding the factories. The old vats, presses, curd sinks, and decayed wood should be removed; the Canada thistle and burdock destroyed, and fruit and ornamental trees take their places. The business is one of dollars and cents. It may be made attractive as well as profitable.

CULLODEN, Ont., Jan. 11th, 1891.

J. F. WILLIAMS.

INSPECTOR MILLAR'S REPORT.

Mr. President, Ladies and Gentlemen: Having been appointed instructor and inspector of milk by the executive of this Association I beg to submit to you my first annual report.

I was appointed to the northern district comprising the counties of Bruce, Grey, Wellington, Huron and the north riding of Perth.

I commenced my duties on the first day of June, making sixty-six visits during the season.

I received applications from forty-seven factories and tested milk at thirty-eight.

The factories I visited are as follows:—Palmerston, Cotswold, Wallace, 3rd line; Gotham, Donegal, Classic, Kastnerville, Kinkora, Willow Grove, Monkton, Silver Corners, Newry, Elma, Briton, Elmbank, Trowbridge, Milverton, Avondale, Winthrop, Brussels, Bluevale, Gorrie, Fordwich, Cedar Grove, Wyandotte, Goldstone, Rothsay, Harriston, Conn, Varney, Alsfeldt, Dunkeld, Brant, Star, Glammis, Climax, Underwood and Burgoyne.

I tested 5,367 samples of milk with the Quevenne lactometer and 2,609 samples with Dr. Babcock's milk tester.

395 of these samples tested 4 per cent and over butter-fat.
2029 " " " between 3 or 4 per cent. butter-fat.
185 " " " less then 3 per cent. butter-fat.

During the months of June, July and August samples taken from the vats tested from 3.20 to 3.60 per cent butter-fat. Then in September, October and November samples taken from the vats tested from 3.60 to 4 per cent. butter fat, only four factories testing as high as four per cent.

I went to the farms of forty-eight patrons to get samples of milk, and had directors go to nineteen others.

I laid information before magistrates against sixty one of these patrons for tampering with their milk.

I got sixty convictions and one case was dismissed. (I might just say a few words here in regard to this case. The magistrates held that my evidence proved that the milk given me as defendant's had been tampered with, but the cheese maker did not show clearly that the sample was defendant's milk.)

Thirty-seven of these pleaded guilty, the fines running from $5 to $30 each and costs.

Fifty of these charges were for taking cream, ten for diluting with water, and one for keeping back strippings.

Nineteen of these cases were in the county of Bruce, four in Grey, twenty-seven in Wellington, two in Huron and nine in Perth.

The Babcock tester is a general favorite wherever exhibited. It never tells a lie, and will catch the meanest kind of a thief—that is a cream thief, every time.

I urged the managers of factories to get a Babcock tester and compel the cheese makers to test fifteen or twenty samples daily and to keep a record of the test.

I learned that a great many of the patrons paid no attention to the straining of the milk, or to the aerating of it by dipping, pouring or stirring, or by the use of a suitable aerator. In many cases no regard was paid to keeping the milk in a clean place where the air was free from bad odors. Quite often you will find a pig trough only a few rods from the place where the milk can will be left standing over night, especially in those sections where the whey is taken back to the farms in the milk cans. Some of the stands serve a double purpose; first as a milk stand, then as a shelter for the hogs, and a few of the patrons are so careless and slovenly that they leave the whey standing in the cans till evening. Now, while these things exist it will be impossible to make a first-class article.

If we could get the patrons to take more interest in sending their milk to the factories properly strained and ærated, the cheese makers would meet with better results and would be more encouraged in their good work. Most of the cheese makers in my district use the rennet test before setting the milk, and in my opinion this is a grand thing, and I believe that it is gaining favor all the time.

In the early part of the season I found a lot of cheese quite open. This I believe was caused by the curd getting too cold in the sinks and was not matured sufficient before going to press. To prevent this I would have the curd sinks made water-tight, and have room enough below the slats to hold five or six pails of water, and by keeping hot water under the slats you can keep your curd at almost any temperature that you wish.

I find that a great many of the thermometers are not correct. I would advise every cheese maker to get a tested thermometer and keep it for testing the ones in use.

I find that some of the makers pay very little attention to the style and finish of the cheese, they press them too quickly and instead of turning them in the hoops in the morning they take them out and into the curing room with them at once where their appearance is anything but pleasing to the eye, and though the quality may be good, they would give a buyer a bad impression at first sight. Wherever I found this I tried to impress upon the mind of the cheese-maker the importance of giving his cheese a neat finish and stylish appearance.

On account of so much of my time being taken up testing milk, attending court, and quite often very long drives between the factories I did not have as much time to devote to cheese making as I could wish for in some cases.

I have had a great many complaints from cheese buyers about the way that a great many cheese are boxed. In almost every factory I find that they have increased the size of the cheese and have not increased the size of their boxes. In other words cheese are frequently found to be one or two inches higher than the boxes. It is a great pity that such is the case, as it is not only a loss to the buyer but it is an injury to the dairy interests at large. Every manager should take interest enough in his factory to see that the cheese was boxed properly before being sent forward to the station.

In conclusion I wish to take this opportunity of thanking the officers of this Association for the help that they have given me during the past season.

T. B. MILLAR.

BURGOYNE, Jan. 11th, 1892.

INSPECTOR HOPKINS' REPORT.

My report as Inspector for the year 1891 is as follows: Having spent the last week in May at the Dairy School, Tavistock, my active duties commenced on the 1st of June. The division of territory allotted to me were those factories convenient to Brantford and the counties of Brant, Wentworth, Haldimand, Lincoln, Welland, and six factories in the Dunnville section, with the later part of the season in the Listowel section, as Inspector Millar had more factories that he could attend. The factories which made application in which I visited and made tests were Boston, Waterford, Vittoria, Bismarck, Attercliffe, South Cayuga, Canboro', Caistorville, Forks Road, Selkirk, Black Creek, Harley, East Oxford, Lossee, Burgessville, Kohler, Tyneside, Markdale, Flesherton, Victoria, Lavender, Avening, Shelburne, Donegal Newry, Elma, Silver Corner, Monkton and Mitchell, not including the Listowel district. I made 5,275 tests with lactometer and piascope, 907 by Dr. Babcock, milk tester. I found

13	samples	under	2	per cent.	of fat.
167	"	"	3	"	"
661	"	"	4	"	"
36	"	over	4	"	"

I got 34 samples from cows and made comparative tests. I laid complaint against 27 parties for sending deteriorated milk to factories, 26 were fined; 1 case judgment reserved. Total amount of fines imposed were $194.50.

As you are aware this has been the first season we had Dr. Babcock's, milk tester, to determine the amount of butter-fat in the milk. I was disappointed in one particular as I expected an increase in butter-fat as the season advanced. I did not find much apparent increase until October, when there was an increase in butter fat. I attributed this to the continued dry warm weather. I do not know whether this was the experience of the other inspectors.

Our time was more taken up with testing milk and attending court this year than in former years. We still find those that take the top off and put the bottom in. While I found some cases of heavy watering and skimming, in one instance the lactometer showed ⅛ water and another case only 1.60 per cent. of fat. Still there is the tea milk and the porridge milk and the rinsing out of the pails all being practiced by some, and these are the excuses that are made. One old lady said her "tae was no good without a good drop of crame," and she could not get John to take his porridge without a good sup of milk; another is trying to keep even with his neighbors, saying they are all guilty but him, so to keep even he would rinse out his pails also. Of course these little matters sometimes becomes serious when they come into court.

A word of observation. While visiting the different factories it has been the object and aim of this Association to raise the standard of our cheese and get a uniform quality. While it is true much has been accomplished yet there remains room for improvement. With all that has been said and done, one is often surprised at the contrast in appearance and quality of the cheese at different factories, and the question arises what is the cause and how can it be improved.

The principle of cause and effect is just as applicable in cheese making as in nature, or in any other business. As one drives through the country he will see some of the causes on the right hand and on the left. On the right at 3 o'clock in the afternoon stands an old rusty can with whey in it, expecting to be put in shape for the night milk, and further on another not cleaned. On the left the cows trying to quench their thirst by drinking vile water, and as you go on further you see a few children milking in the barn yard or in a foul stable. As one drives up to the factory you see the cheese maker anxious and care-worn and almost discouraged; he will tell you one vat worked very fast, another was very gassy, the third would have been very good only for the flavor. We saw the cause on the road. The effect was seen in the cheese as we entered the curing room, with the temperature as high inside as out. In some factories with a little outlay for proper presses and utensils the possibility of making a neater and better cheese would be accomplished. I cannot excuse the maker in every instance for some do not rise to the emergency of the case, being satisfied if he gets his cheese off his hand, and able to get just inside the gate. I found some makers trying to get along with too little help, claiming they cannot afford to have more. One of the abuses in cheese making, and one that should receive the attention of every factory, especially those that return the whey in the cans is the care, or no care, some patrons take of their cans. When the cans are not properly cleaned there is always a bad odor in the milk, and that is one of the causes of the objectionable flavors in the cheese. In examining some cans I found those that had the tin eaten off by the whey; such cans cannot be properly cleaned with two quarts of luke warm water, and should not be used in sending milk to a factory, as it is almost impossible to get the whey flavor out sufficiently not to injure the milk.

To mention some whey tanks and the direct loss sustained in letting the whey get so acid is that they are seven times sourer than they are wont to be soured. Still this manifold timed soured stuff is put into cans that milk is delivered to factories in.

I do not wish to raise the question of returning the whey in cans or otherwise, but having watched the practice and its results I must attribute largely a peculiar flavour so objectionable to buyers to the present practice. To those that are feeding whey, do not change. But to those that will return the whey in the cans it will pay in feeding as well as raise the quality of our cheese if the tanks were so arranged that all the whey would be taken out each day, and the tanks kept clean and the whey sweet as possible, and better attention paid to cleaning cans and caring for milk generally.

If we could raise the value of our cheese in Canada only ¼ of a cent per pound it would bring $200,000 more money. Therefore, as all are interested, all have a part to do, and all will be benefited.

J. E. Hopkins.

Mr. Hopkins closed by saying that the successful man to-day was the intelligent practical one. The day of chance and luck was gone, therefore with all the means at our disposal, let us become masters of the situation which we occupy as dairymen, and the year 1892 will be one of advancement

THE FINANCIAL POSITION.

Mr. JOHN GEARY discussed the financial position of the Association. He said: It has afforded me great pleasure to notice the interest with which the proceedings have been followed so far as they have gone. I can only hope that the subject upon which I am to address you may prove equally interesting. The business in which we are engaged, that of dairying and dairy farming, has become more a science than it used to be.

It cannot be carried on now as it used to be in a haphazard or slipshod fashion. This Association has been in existence for about twenty-five years. When it began, the cheese product of Canada was about a quarter of a million dollars a year and a large portion of our own supply was imported from the United States. To-day, besides what is used in the country, we manufacture something like $9,600,000 worth of cheese for export. This development, I am satisfied, has been brought about almost altogether through the exertions of this Association and by the discussions that have taken place at these Conventions from year to year. I am sorry to say, however, that the finances of the Association have prevented much that the Association would like to have carried out. As has been explained to you, during the past year four inspectors have been at work inspecting the factories and testing the milk supplied, wherever their services have been applied for, and the dairy school has been carried on, presided over by Professor Bell. These things have to be paid for. Besides these we have had the experiments, and I may say they are very valuable experiments, carried on by both the Dominion and Ontario Governments. The Ontario Government, of course, has given the Association a money grant besides carrying on the experiments I have referred to. The Dominion Government also has expended a large amount of money. I believe I am right in saying that Professor Saunder's grant was $25,000 to be expended in the work he has carried on. I have been told that it was impossible to get the farmers to support an institution intended altogether for their own good and for the carrying on of their own business. Now, I am a farmer myself and I do not believe that story. I believe that if the matter was placed fairly before the farmers and the dairymen of this country they would subscribe liberally to provide funds for the work we have undertaken to do. Now, the number of factories within the jurisdiction of the Western Dairymen's Association is, as near as I can make out, about 300. Of these 300, I am sorry to say, only 132 applied for or received the services of these inspectors this summer. That is not as it ought to be. But take as a basis of figures to work upon this fact, that there are about three hundred factories. As near as I can figure it, the average number of patrons supporting each of these factories is about 70, that is there are between 21,000 and 25,000 patrons who are sending their milk to these factories each year. A very small amount of money paid by the patrons of these factories will enable this Association to carry on its work in a much more successful manner and will enable it to do much more good than it has ever done in the past. Suppose every factory were to take this matter up and bring it before its patrons in proper form, I believe 50 cents per annum could be collected from each of those patrons for the support of this institution. I have no doubt of it, because I have tried the experiment in my own factory this fall. At our closing meeting when the patrons were present (I am sorry to say there were not a great many of them there at the time, as many of them rely upon their neighbors to carry their cheques home) I laid the matter before them and showed them that every man becoming a member of the Western Dairymen's Association would receive for his one dollar membership fee the annual report of the three Associations of Ontario—the Eastern and Western Dairymen's Associations and the Creameries' Association—and I also stated, and I believe I was right in this, that each member would receive all the bulletins issued from the experimental farm at Ottawa and all the bulletins issued by the Agricultural College at Guelph. These are far more than value for the membership fees. The documents are worth more than that amount for kindling to light their fires even if they never looked inside of them, and there is in these reports and bulletins information of the greatest possible value for those interested in the business who will take the pains to read them. I asked my patrons to come forward and place their names

on a paper subscribing to this Association, and not one of the 27 who were present refused to do so. And they are members of this Association to-day. That is something which can be done by every factory. It is not necessary that every patron should be asked to pay $1 a year. This was done in my case simply as a test to see if the idea could be carried out. What can be carried out in my factory can be just as well carried out in every factory in this Province if it was taken hold of properly and fairly placed before the people. The farmers want to be progressive; they want information respecting their business placed before them in proper shape. I find that at our conventions those whose support we receive in the form of membership fees are cheese-makers principally. That is not as it ought to be. I am a farmer myself and a dairyman and I can speak on behalf of the farmers as well as on behalf of the dairymen. I am sorry to say the attendance at these conventions is not what it ought to be. There is a very fair attendance here to-day, but this room ought to be crowded; that gallery ought to be filled. Those who most need the education do not come. It is the masses of the people we want to get at, but we do not do it by these conventions; we must get at them some other way. This is an absolute necessity and we should encourage competent people to visit different parts of the Province during the winter months to deliver addresses to the people in the different districts giving them information upon these subjects. If that is done you will see these conventions crowded to the doors. Here is the financial statement of our Association for the present year: Our receipts from all sources this year outside the amounts paid to the inspectors by the 132 factories inspected (which would be $660) are $3,163.74. Out of that amount the Government grant is 2,500, leaving as received from other sources only about $663, paid by those engaged in this industry throughout the Province of Ontario. I think that every patron of a cheese factory will admit that this is not as it ought to be. I think they ought to support their own institutions a little better than they have been doing. As to the disbursements, it must be remembered that there are no salaries paid by the Association, except to the Secretary-Treasurer and that is a very small amount. The items include expenses of Convention, salaries and expenses of cheese inspectors and others, above all of which there is left a balance of $290.42, with about $1500 or $1600 of debt to pay. When your directors need money, instead of having it in the bank they have to go to the bank and negotiate a loan. This could be changed if the matter was brought before the people. If this is not done I cannot see but that we must remain in the same groove as we have been in for the last twenty-five years, with no further advance than we have made for twenty-five years. Last year you had the benefit of the inspectors, but this year we cannot hope to have them unless the patrons will take this matter up and try to support the Association more liberally than they have been doing in the past. Whoever your Board may be during the ensuing year, I hope they will make a special effort in that direction, and if necessary, I hope they will send men over the country to place the matter before the factories and have our finances placed in proper shape. This Association ought to have not less than ten or twelve thousand dollars a year to spend upon an industry which has increased so rapidly as the dairy industry has done within the last twenty-five years. It is not unreasonable to expect that this business can be increased in volume from ten million dollars to twenty million dollars. It has taken twenty-five years to increase it from nothing to ten million dollars, but with the experience people have gained in making cheese I am satisfied the business can be vastly improved and our cows, instead of yielding a profit for six months during the year, will yield a profit for nine or ten months and that the industry can be increased in ten years to twenty millions of dollars I hope the remarks I have made will be of some use, and that every man will feel an interest in trying to do something to carry out the efforts made by this Association to keep abreast of the times.

The PRESIDENT.—We must all feel very much indebted to Mr. Geary for bringing this matter before us in the practical way he has done. It is perfectly true we have not been able to expend all we would like to have expended; in other words, we have not been able to do all the work that otherwise we might have done. I am a firm believer in the doctrine that Providence helps those who help themselves. I have often felt humiliated when asking the Government for an additional grant for some special work

we wished to undertake, and the question was asked why we did not do it ourselves. I recognised to the fullest extent that it was our duty to do it and that we were able to do it if our people could be reached, but therein lay the difficulty. Mr. Geary has to some extent solved that difficulty so far as the patrons of his own factory are concerned, and, as he says, what his factory has done others can do. We are in a better position now than we used to be when we had a small grant, because we do not have to print our own reports. The Ontario Government kindly prints the reports for us and sends them to our members, so that we have in one book the Eastern and Western Dairymen's Associations and the Creameries' Association reports with all the papers and discussions printed in full. In addition every member will get the Ontario Agricultural College report, a most valuable document. I cannot imagine that there is any man at all interested in the business who cannot afford to pay a dollar to receive the benefit of so much information as these documents will give him. There is only one way of doing it, as Mr. Geary says, and that is to bring it before the people. It is difficult to get at the patrons in any way except at the annual meetings. Had we the resources we would be able to pay competent people to address the patrons upon matters relating to their work to impress upon them the importance of cleanliness and their duty in the matter of furnishing the milk in good condition. It would be a good thing if we could adopt some plan by which we could communicate with one individual in every factory so as to arrange for these meetings. The opportunities so far as this season is concerned have largely passed, I know. But if we adopt such a plan for the future I hope we shall have the co-operation of every one connected with the management of the factories. Had we this money we would be able to prosecute our experiments much better. There is hardly an important improvement in cheesemaking adopted in any part of the world but was initiated by the Western Dairymen's Association. The increase in the product and the high prices that are received are the best evidence of what we have done.

Mr. Chadwick.—As one long connected with the Association, and as one tolerably intimate with its affairs since its first organisation—as I was one of the initiators of it—it affords me great pleasure to meet my fellow citizens at meetings of this kind. We find collected here a body of men as capable as any similar body in the world. I have seen the people of many countries, of America and Europe, and I always stand up for my own fellow citizens as being capable in the management of their own affairs. Mr. Geary has brought before you a matter of great importance. He and the other officers of the Association have nothing particular to gain by exerting themselves on your behalf. In thus endeavoring to promote your interests they should receive a cordial response. The appeal made to you by Mr. Geary was a most practical and sensible one. The world moves through the influence of money. It will serve you if you use it well. I sincerely hope the appeal will come home to every one who is interested and that we shall find such a response as will greatly improve the material standing of the society.

Mr. J. S. Pearce.—I have a resolution which I have no doubt will be unanimously passed. Arrangements are now being made for a very important exhibition in Chicago, the World's Columbian Exposition, as it is called, and I think the dairymen of Ontario ought not to be behind in making arrangements for that event. Canada must be well represented at Chicago and we should not fail to do our share. I move the following resolution :

Resolved,—That in view of the magnitude and importance of the dairy interests of Canada, and the favorable attention which has been called to the natural resources and agricultural capabilities of the Dominion through the excellence and reputation of our cheese and butter, we the members of the Dairymen's Association of Western Ontario in Annual Convention assembled, hereby respectively commend to the attention of the Minister of Agriculture the desirability of instructing the Dairy Commissioner of the Dominion to take such steps as will secure a representative and creditable display of dairy products from Canada at the Columbian Exhibition or World's Fair to be held at Chicago in 1893.

This resolution was seconded by Mr. John Geary and unanimously adopted.

The meeting then adjourned.

AFTERNOON SESSION.

The Convention resumed at 2 o'clock, when the subject of corn ensilage came up for discussion.

CORN AND ENSILAGE.

Professor SAUNDERS.—I have been asked to speak on the subject of corn. When I came here I had no idea that I should be called upon to discuss that subject. I had prepared to speak on a different subject and that was disposed of last evening. But in the kindness of his heart your President has thought it best to give me something more to do, and, being a willing servant of the public, I am happy to do what I can to meet his wishes. At the same time I must beg your forbearance in case I do not upon this subject give such clear and full information as I might have done had I the opportunity to prepare myself for the work. The importance of the corn crop to the dairymen of this country is as yet but imperfectly understood. It is now becoming one of the great factors in successful dairying for its use in the green state as ensilage is giving to the dairyman and farmer an abundance of succulent cattle food at a very economical rate, enabling them to produce dairy products much more cheaply than they could possibly do under the old system of feeding. In the fourteenth bulletin of the Dominion Experimental Farms, I have endeavored to give a very full resumé of this subject, as far as the data accumulated at the farms would enable me to do, covering experiments extending over three years with about ninety varieties of corn. To this bulletin I would refer in case I fail to give you all the information you desire. The reports of the Dominion Experimental Farms will be sent to any who ask for them. That principle has been adopted because a general distribution would involve much more labor and expense. I make this remark here to correct what might be an erroneous impression made by the remarks of your vice-president, Mr. Geary. The bulletins and reports are not sent to members of this Association as such, for we have not the list, but I shall be happy to see that promise carried out if the Secretary will furnish the list of members so that they may be placed upon the mailing list of the Experimental Farm. Indian corn may be divided into four classes. There are the Dent corns, the Flints, the Sweet corn and Pop corn. The Dent varieties include a large number of very strong growing sorts, several of which have been used extensively for the purpose of ensilage. Among these are the Mammoth Sweet, the Red Cob, the Golden Beauty, the Farmers' Favorite, the Virginia Horse tooth, and a number of other sorts of the same type. These make rapid growth in this country, especially in western Ontario, greater probably than any other variety of corn. There is one unfavorable peculiarity about them however, and that is, that most of them mature too late in this climate to permit of the plants building up in their tissues that amount of nutritive matter which is required for the use of the dairyman. If one examines these Dent varieties of corn carefully he will notice a peculiarity in the structure of the seed which distinguishes them from other sorts. The seeds have a peculiar tooth-like appearance with a corrugated or uneven top. From this they get their name "Dent," which is the Latin word for tooth. These are easily distinguished from the Flint varieties which have a rounded surface on the top of the kernel. The sweet corn may be known by its seed being wrinkled and uneven on the surface, and the pop corns by their small size and peculiar pointed form. The Flint varieties ripen as a rule earlier than the Dent corn and for this reason are better for the dairyman's purpose in this province. I would place first among these Flint varieties the Rural Thoroughbred White Flint. This corn is comparatively early in ripening, and with its peculiar branching habit and leafy stem it produces a weight of material for ensilage which we have not found in any of the other varieties tested at the Experimental Farm. During the summer of 1890 we had an acre of that corn which, when weighed, gave a little over thirty tons. That was on a very good piece of land for corn and this could not be taken as an average yield. This year that variety on ordinary land has given from 20 to 25 tons. I think with reasonable cultivation in western Ontario any farmer could calculate on getting from 18 to 20 tons per acre from this variety. He could grow 25 tons with extra

care if his land was in good condition. I have known yields of 40 tons to the acre of this variety in Ontario. When we compare Indian corn with hay in feeding value and in cost of production we find a very great advantage on the side of the corn. Taking, for instance, 18 tons per acre as the crop, that is equal to at least 6 tons of well cured hay. You know very well that such a quantity of hay as that cannot be got from an acre of land in this or any other country. Three tons of fodder corn green is equal to a ton of hay. Some dairymen whose opinions are entitled to great weight claim that two tons of ensilage is equal to one ton of hay. Professor Robertson is of that opinion and has good reason for it, but it is quite safe to say that three tons of green corn is equal to a ton of hay. We know that much depends upon the ability of the animal to take nourishment from the food it consumes, and that would tell in favor of green corn in a comparison with hay, for in the corn the nutritious matter is in a condition to be more readily assimilated by the animal than dry hay and thus makes more milk or flesh. In order to get corn of the best quality some attention must be paid to its cultivation. With regard to the planting of corn the ideas of the more intelligent growers of the present day are entirely different from those of eight or ten years ago. Many of you will remember that a few years ago corn was sown almost invariably broadcast and three bushels to the acre was about the quantity sown. The result was a rank dense growth of stalks about two-thirds as high as they ought to be, very succulent and watery but not having the proper amount of sugary and nutritious matter. Experience has shown that the best way to sow corn for fodder is in rows from three feet to three and one-half feet apart and the plants in the rows not less than six inches apart. In many instances it is bettter to have them eight, nine or ten inches apart. Corn thus sown is exposed to the influence of the air and sunlight, and it is by these influences that the starchy and sugary matter are developed and thus the corn becomes more nutritious. No doubt most of those present have grown corn, but if there are any who have not I would advise them to do so. I have here the results of the analysis of the fodder corn grown at the Experimental Farm showing the proportion of nourishment which will be found in a crop of corn at different periods of its growth. When the tassels were well out the weight of the crop was 22 tons, 1,329 pounds per acre, and the weight of digestible matter per acre, 4,220. The corn had reached a good height, but it was succulent and watery. Later when the corn was well headed out the weight per acre had increased to 24 tons, 52 pounds and the digestible matter to 5,069 pounds. Still later, when it was in the early milk stage the weight was scarcely so great being 22 tons, 1,806 pounds, but the digestible matter had increased to 5,873 pounds. Still later, when in the late milk stage, the corn had become less watery, the weight of yield had decreased to 21 tons, 759 pounds, but the proportion of digestible matter had increased to 6,012 pounds. The increase in proportion of digestible matter was still greater at the period of glazing which is the time generally recommended by those who have studied the subject as that when the corn should be cut for ensilage. At this stage the amount of digestible matter was 7,308 pounds as against 4,220 pounds at the period of tasseling. So you see the period at which the corn should be cut is one of vital moment. In this connection it will be useful to compare the quantity of digestible matter per acre of corn with that of other succulent foods used by the dairymen. In this comparison the average yield of fodder corn is taken from what we have obtained this year on the experimental plots at Ottawa, and the average yield of turnips and mangels is taken from the returns of the Bureau of Statistics of Ontario, which figures are the only ones available for this purpose. An acre of corn at the glazing stage yields 7,308 pounds of digestible matter or 339 pounds per ton. Multiply 339 by 3 and you will have 1,017 pounds, and as the digestible matter given in pure clover hay is 1,034 pounds per ton you will see that these are about equal. These two products would be equally useful if the animal were able to assimilate the same proportion of the nourishment contained in both these forms of food, but I believe it cannot do that as well in the case of the hay as in the case of the green succulent corn. Take the carrot crop which is given for the last ten years in Ontario as averaging 10 tons, 820 pounds per acre. That contains 173 pounds per ton of digestible matter as against 339 pounds per ton for the corn. In a crop of turnips the average yield is given as 11 tons, 1,460 pounds, which

most of you will regard as a low average. This crop will give 2,266 pounds of digestible matter per acre or 179 pounds per ton. Mangels are said to yield an average in Ontario, of 12 tons, 1,620 pounds per acre, giving 2,231 pounds per acre of nutritious matter or 145 pounds per ton. I wish to carry this a step further and to call attention to the advantages which may be derived in some sections, where the corn crop cannot be successfully grown by the use of green crops of oats, barley and peas, or oats, barley and vetches or oats and barley alone. These grain crops cut green come in at a time when the farmer is not busy with other crops, and if sown on fairly good land will yield from 8 to 10 tons of green fodder per acre, and give an average of at least 3 tons of cured hay; or if a man has a silo he can convert this green crop into ensilage which will serve a good purpose. Green oats yield 208 pounds of digestible matter per ton or 2,080 pounds per acre. Green rye yields a little more than that. I do not want to burden your memories with too many figures, but I would like to call attention to the proportions of water which these different crops contain, showing again the advantages which fodder corn possesses over ordinary roots. I shall refer only to the crops of these roots that we have been getting at the Experimental Farm at Ottawa, under an ordinary system of farming. These show that the averages for Ontario are far lower than they ought to be. I have no doubt the figures are carefully prepared, but the yield could be much increased, thereby adding greatly to the wealth of our people. Our chief fertiliser is barnyard manure, of which we apply 18 to 20 tons per acre, and most of the land is treated in that way about once in four years, and this few farmers will consider too liberal treatment. Part of the land for this farm was in poor condition, some of it had been under crop for 25 or 30 years, other parts of the land were in very fair condition. The average yield of mangels from three field plots in 1889 was 10 tons, 1,750 pounds; in 1890, 30 tons, 531 pounds. That is the average of 36 varieties grown in plots, two rows of 66 feet long being taken as the basis of calculation in each variety, showing an increase of more than three-fold. I have not the figures of this season, but I think they will about come up to the yield of last year. Taking one year with another it is safe to say that with good land and good farming we should get in Ontario from 25 to 30 tons of mangels instead of 12 tons, 1,620 pounds. In carrots the average yield at the Experimental Farm for 1889 was 15 tons 91 pounds, in 1890, 23 tons, 1,061 pounds. But as this included many of the small growing sorts it was not a fair basis for judgment. The only two field plots gave 31 tons, 567 pounds per acre as the average. The yield of turnips in 1889 was 13 tons, 513 pounds, in 1890, 26 tons, 769 pounds in the small plots, and in the field plots 27 tons, 127 pounds. I mention these points to show how, with reasonable cultivation and with his land in good condition, the farmer may calculate on getting good returns for his labor. Among the varieties of corn desirable for cultivation I would name Pearce's Prolific, Longfellow and Canada Yellow. These with the Rural Thoroughbred White Flint are the varieties which have yielded the best results with us. The three first named do not give so large a yield as the Rural Thoroughbred White, but they give satisfactory yields and I could recommend them to any farmer growing corn for ensilage, especially where the season is short. Another variety known as Mitchell's Extra Early Flint matures in a very short season. In Manitoba and many parts of the North-West it has matured sufficiently to give very good ensilage. I do not think it is a variety the farmers in Ontario need to grow, because they can use these other sorts which give a larger yield. In preparing the corn for the silo the best plan is to cut it down and let it lie for a day or two to wilt, the length of time depending on the weather. This will relieve it of perhaps 20 to 25 per cent. of its weight of water, leaving less weight to be taken into the barn. It is as easily cut up and it makes, as a rule, better ensilage than where it is put in green from the field, as there is less disposition of the mass to sour. The corn is cut up with the ordinary cutter and with a carrier is transferred to the silo. I suppose it is unnecessary for me to explain to you how a silo is constructed. The principle aimed at in their construction is to secure an air-tight chamber with air spaces of six, or eight, or ten inches between the inside and the outside boarding. This air space has the effect of equalizing the temperature so that the cold weather will not affect the ensilage and the heat formed in the mass will not be allowed to pass out and render the ensilage as the season advances liable to be frozen. As the corn is cut and dropped into the silo two or

three men are engaged to tramp it down, particularly around the edges. That is the weak point with some silos, that sufficient care is not taken to pack the edges. In the centre it is not so important because the weight of the mass above will closely pack the material below. Corn thus handled is a cheap food. From careful calculations made last year we found that the ensilage used to feed our stock cost $1.40 a ton. When you consider that three tons of this is equal to at least one ton of hay you will see that in order to feed hay to equal advantage you must get it at $4.20 a ton, and no farmer can produce it at that price.

At this point of the proceedings the President announced the presence of Mayor Read, representing the City Corporation of Brantford, and Ald. Bunnell, representing the Brantford Board of Trade, to bid the members of the Convention welcome to the city. His Worship the Mayor being called upon, made a brief address expressing the pleasure it gave the corporation and citizens of Brantford to have the Convention held in the city. He spoke in appreciative terms of the representative character of the Convention and the importance of the interest it represented, as well as of the good work which had been done by the Western Dairymen's Association during the 25 years of its existence. He was followed by Ald. Bunnell vice-president of the Board of Trade who expressed regret at the absence of the president, Mr. Charles H. Waterous, explaining that that gentleman was confined to his house by illness. On behalf of the Board of Trade and the business community of Brantford he also welcomed the Convention to the city, expressing the hope that the proceedings would be alike pleasant and profitable to all. The President briefly responded, thanking the Corporation, the Board of Trade and the citizens of Brantford for the kindly welcome which had been extended to the members of the Convention through their highest official representatives. Mr. Chadwick also spoke briefly as one of the oldest members of the Association, acknowledging the courtesy of the people of Brantford.

The Convention then proceeded with a discussion of Prof. Saunders' paper.

The PRESIDENT.—Would the glazing stage be the proper stage for cutting if carried into shocks and fed in that way?

Prof. SAUNDERS.—Yes, I believe it would. We are testing that matter this winter. A considerable quantity has been reserved as dry corn—stover as it is called, and we are now instituting comparative tests between that and the ensilage, so as to be able to inform farmers as to their relative merits. If the corn is allowed to mature, the starchy and sugary matter which is laid up in the tissues of the plant through the leaves is drawn upon by the ripening seed, and though it is present, it is not so well distributed nor in such a form as to be easily assimilated.

The PRESIDENT.—If you take it at the glazing stage and put it up in shocks will it not ripen considerably after it is cut?

Prof SAUNDERS.—It will to some extent. That is true of every cereal. From the time it is cut to the time it is thoroughly dry it is drawing from the stalk these nutritive materials, and that is the reason why grain that is cut a little on the green side and shocked is found to be quite as plump in threshing as that that has been allowed to fully ripen. For that reason it will probably be found to be more advantageous to convert the grain into ensilage.

Mr. J. W. SCOTT.—Why not cut it at an earlier stage?

Prof. SAUNDERS.—I do not think that would overcome the difficulty, because at an earlier stage you do not have the amount of nutritious matter in the plant which it has the capacity of drawing up from the ground through the roots. When we have finished the experiments we now have in hand I think that we will be able to show that corn cut at that stage and even shocked is very valuable fodder and can be provided at a very cheap rate.

Mr. VARDEN.—Is there any advantage in allowing the corn to wilt to off-set the disadvantage of the corn getting wet while it is lying out?

Prof. SAUNDERS.—The moisture is not absorbed by the corn in that condition. After a rainstorm you will find it in drops on the leaves and it shakes off. If you weigh the

corn before the rain storm and after the rain has been shaken off by handling you will see that there is no appreciable difference. The only disadvantage of it getting wet would be to increase slightly the inconvenience of handling We have tried it several times taking it into the barn, cutting it up, and putting it into the silo and we have found that the small additional amount of moisture it carries into the silo is a matter of no moment whatever.

The PRESIDENT.—This question of the proper time for cutting corn is of the greatest importance. Until two or three years ago we had nothing to guide us on this subject, but I think Prof. Roberts of Cornell, was the man who discovered the high nutritive properties of corn at the proper stage of maturity. Instead of getting quantity without quality they found that they might get more nutrition in one-half the quantity. There is another point upon which we do not know what the result will be, and that is cutting corn at the glazing stage, at which they find it the more nutritious, and putting it into shocks. It is found that the cornstalks in the inside of the shocks remain perfectly green for feeding. But of course the corn matures, and whether the loss through that is greater than the disadvantage of the silo is what we would like to know.

Prof. SAUNDERS.—We will be able to answer that after our experiments are completed. In the present stage of our knowledge we are not able to answer that question.

Mr. J. S. PEARCE.—The experience is that for the first two or three months after the corn has been cut the difference is not perceptible, but when it gets on into January and February it is marked. The nutritive properties of the corn cut and stored in the barn are not so great. I was talking with a gentleman on that subject the other day and he says the difference is very marked. I think that is the point that. Prof Saunders ought to go into, to compare the relative value each month after the corn is cut, up to say the 1st of March.

Mr. ASHLEY.—The corn is generally all fed by that time.

Mr. PEARCE.—The advantage of the silo is that you have the fodder all winter and spring. The experience of those people I have talked with is that the corn shocked is not nearly so nutritious after the middle of this month.

Prof. SAUNDERS.—This illustrates one of the advantages of attending these meetings; we learn the questions which practical men desire to have answered and thus we have a guide for our work on the Experimental Farm.

Mr. ASHLEY.—My experience with the silo has not been favorable; that is it has no been a success with me. Still I am in favor of the silo. I do not believe however that it will answer for the man keeping only a small number of cows. I have had only ten or twelve cows; and have not been able to feed enough of the ensilage to keep it from moulding. You must feed at least three inches off the top of your silo each day. If you do not feed it off you must rake it off anyway and throw it away. I would be glad if Prof Saunders would tell us what size of silo is the best. I have had one, 10x12 feet by 16 feet high. I have had one also 16 feet cube. I filled one a year ago last fall (the smaller of the two) and took great pains in filling it I have not opened it yet, but I think it is not more than one-quarter the height it was when I filled it. I think also it is all spoiled. You may say the silo was not well made. I took extra pains with it. I filled the bottom with clay and the sides were made of matched siding, and then I daubed it with coal tar. I think my silos are not deep enough to keep the contents properly, and if so that is a thing that ought to be known.

Prof. SAUNDERS.—In regard to keeping ensilage I cannot explain the cause of failure. We have found the amount of subsidence to be about 3 feet in 17. We have no difficulty whatever in keeping ensilage sweet and we have tried it for three years.

Mr. ASHLEY.—How deep is the silo?

Prof. SAUNDERS.—About 17 feet and from 16 to 17 feet square. The silo is calculated to hold 100 tons. There are two of them side by side. The first year we covered both sides of the silo with about a foot of cut straw. One side we sprinkled in that way and on the other we mixed a bushel or two of oats so that the moisture arising from the ensi-

lage might be taken up. That side was not weighted in any way. The other side was sprinkled with straw, and weighted with planks and a quantity of heavy stone. The results seem to show that the weighted side of the silo was a little the best, but not enough of difference to make it worth while to go to the trouble of covering and weighting. The second year we weighted one side without putting any straw and we covered the other side with a foot of cut straw, without any weights. The side that was weighted, turned out the best, the other side had about three or four inches of the ensilage at the top decayed. This year we have put no weight on either sides, simply covered each side with a foot of cut straw. Both sides have come out perfectly sweet. We have never lost a ton of ensilage from souring since we began the experiment. So far as that difficulty is concerned about having to remove the whole top layer every day, if a man has only a few cows he need only cover half the silo with about six or eight inches of straw and use from the other half, transferring the straw to that half for the next day and using from the side thus uncovered. In that way he can use a small quantity of ensilage and keep the whole perfectly sweet.

Mr. John Robertson.—Would the kind of corn put into the silo make any difference in the subsidence?

Prof. Saunders.—I took it for granted that the corn was cut at the usual stage.

Mr. Robertson.—Would it make any difference if the large Southern sweet corn was used instead of the flint corn?

Prof. Saunders.—The more succulent the corn the greater the subsidence. The more mature the corn is, the firmer it becomes, and the less it will settle.

Mr. Ashley.—The corn was the large Southern sweet corn. It was ripe enough to cook, and the silo was filled about the usual time we fill the silo.

Prof. Saunders.—Was it glazed?

Mr. Ashley.—I think it was. This year I have cut the corn and set it in the stacks. The ears have got quite ripe. I cut it up now and feed it to the cows with a little bran.

REPORT OF NOMINATING COMMITTEE.

The report of the nominating Committee was then presented and its adoption moved by Mr. Hately, seconded by Mr. Hopkins. The resolution being carried the officers named were elected, as detailed in an earlier part of this report.

A PRACTICAL TALK ON GRASSES.

Professor Fletcher, Dominion Entomologist, said: While I do not believe there is anything more important in connection with the Experimental Farm than my own special work of examining the habits of the insect enemies from which the farmers suffer, I am to speak to you to-day upon another branch of my work which also is of great importance, and it is one that will appeal to you more directly than that which was the subject of my address yesterday. I am to speak to-day upon the subject of grasses. The statement is sometimes made to me at farmers' institute meetings by farmers present that the grass in their meadows gives out. The statement will surprise some of you when I tell you that we have in Canada no less than three hundred different kinds of grasses many of which differ from each other very materially so far as you are concerned, that is, so far as concerns the agricultural qualities which must decide their value to you as food for your cattle. A grass to be valuable must be productive, and it must be nutritive and digestible; that is, the chemical analysis must show that it has the necessary constituents of good food. It must be also suitable to the climate where it is to be grown. In the seed mixtures sent out by seedsmen we have many grasses that are practically useless

and many not so useful as those you find growing wild in Canada. I am in correspondence with the leading seedsmen of Canada, and they have recognised that in saying this I do not wish to injure them, in fact that I am helping them by pointing out those of the permanent pasture mixtures and the hay mixtures which are not best suited for cultivation in Canada. They can only sell what they can get, that is, what the market furnishes, and these are not always the most valuable kinds. Let me give you an instance. My experiments at Ottawa have shown me that the rye grasses so much esteemed in England are unable to stand the winters in most parts of Canada, and yet these grasses form about fifty per cent. of most of the permanent pasture mixtures which are sold by our seedsmen. The varieties of perennial rye grass are very short-lived in Canada, and Italian rye grass only lasts one season, so that fifty per cent. of the grass seed you buy is of no use to you for permanent pasture. More than that, the seed mixtures sold by seedsmen contain the seeds of many grasses which die out in a short time. In an ordinary mixture there are eighteen or twenty different kinds of grass, and if you are observant you will find that the number of varieties the first year very much exceeds the number you can find there in following years. So much is this the case that after three or four years you will find little else in your pastures than the June grass which every farmer belittles. It soon takes possession of the land; it comes first in the spring and lasts late into the winter, gives fine succulent feed, and the more you cut it the more it grows. Among the English grasses which have been introduced, some are of considerable value while others are not, and most of the experiments which I am about reporting to you have been undertaken in order to find out which of these grasses are the best worth growing. Of the most esteemed European grasses, several are only suitable in some localities, and by means of a distribution of seed, which has been begun by the Hon. Minister of Agriculture and Mr. Saunders, under my direction, and which will be carried on more extensively this spring, we hope to find out which are best suited for the different districts of Canada. Any one who wishes to test these grasses for his own district will be put on the list for distribution, so far as the amount on hand will allow, if he will send in his name to the Experimental Farm. We have, I find, many of our native grasses by which we can supplement the supply of useful fodder plants for the dairyman, many of which are easily procurable throughout the country. I shall speak to-day only of two grasses. Clovers are usually spoken of as grass, but I shall restrict the discussion to grasses as that word is botanically understood. The largest grass is the bamboo, which rises sometimes to a height of from 80 to 100 feet, with a stem ten inches in diameter, so that in China and Japan it is a common practice to make vessels and utensils of various kinds of joints of this grass. They use it also, I am told, in the early spring when it first appears as we use asparagus. One stem such as I have mentioned would make a good dinner for an ordinary man. Another grass that everybody knows about, but does not at first seem to be a grass, is the corn plant. We used to hear a good deal about corn being king, though we have not heard so much of that lately, but the system of ensilage is making it so easily available for dairying purposes that we may regard it as coming to the throne again. All the cereals are grasses, and all these you know, as wheat, barley, oats, are valuable food; but the grasses I shall speak about now are the low grasses which we use in meadows and pastures. As I have said, many of our native grasses are exceedingly valuable, and this has been shown by the results of experiments which we have made at Ottawa. The method adopted in these experiments is briefly as follows: The seeds were collected from all the varieties best known and sown. When a sufficient quantity of seed had been gathered to plant a square rod, $\frac{1}{160}$ of an acre, that amount of land was devoted to the cultivation of each species. I have here several photographs which will illustrate these experiments, and you will see by these that there is a sufficient quantity of each grass grown to carry out the necessary investigations and experiments by which we endeavour to learn their value for feeding purposes. I will now give you a short statement concerning some of the varieties grown. In every seedsman's catalogue you will see Sheep's Fescue spoken highly of. Its height is about three or four inches. Its only value is that it will grow on rocky pastures or on sandy hills where nothing else will grow. We have found Hard Fescue to produce twice the amount of fodder and of the same quality. If you have determined to use one of these fine-leaved Fescues, I would advise you to get

the Hard Fescue. But for most places you can get better grasses well suited to your purpose. We must come down to the native grasses in many parts of Canada as our standby. Throughout the North-West and Manitoba I have no doubt we must rely largely if not entirely upon the native grasses, which up to this time have not been cultivated. One of the most valuable grasses of the western cattle ranches is a close relative of the ordinary quack grass. It has finer leaves and produces more of them. When the time comes, however, for them to plow up their prairies and use what is now ranch land for farming, they will have trouble with this grass. For the present it is the grass above all others that is permanent. But of course it will give way before hard work and close attention, just as the quack-grass does before the hard work of the farmer in these eastern districts. This leads me to consider another evil that may arise from the careless importation from Europe of seed grasses, and that is the bringing into the country of noxious weeds, which are treated here far differently from what they have been used to in the old country, where they have existed by roadsides and in waste places. Here we prepare the soil for our pastures and give them every chance to grow, the result being that we find many weeds of European origin that are here exceedingly troublesome, but which are not recognized as such in Europe. That, too, is the case with many injurious insects. Probably every known insect has a parasite which feeds upon it, but when we import the injurious insect we seldom introduce the parasite at the same time. With the weeds, which are parasites on our cultivated crops, we introduce them and give them a better chance to grow than they ever had before. A large proportion of the seeds handled by the seedsmen here are received from dealers in the old country, and in many cases the seeds have been collected in the mountains of Germany, often by children and others who have not the knowledge necessary to distinguish between closely allied species. Thus, though some are useful and some worse than useless, they are often found in the same package. The first native grass of the results of which I desire to speak, is Redtop. This is well-known to Canadian farmers, but all do not recognise its special value. It will yield an excellent crop of fine sweet hay, two and a half tons to the acre being no unusual yield, and it will grow everywhere. Timothy is generally grown in low lands and rich clay loams. If you mix Redtop with Timothy you will get a larger amount of hay than if Timothy be sown alone. A grass introduced from Europe which has great value owing to its large yield, is known as "Austrian," or as "Smooth Brome Grass." Another is Meadow Fescue. This latter gives a large amount of good hay, and it will stand any climate to which I have subjected it. Another advantage is that it produces a large amount of pasture early in the spring and late in the autumn. The Orchard Grass which is cultivated in many parts of Canada with success is not successful with us, as it is not sufficiently hardy to stand our winters. I should think it would be valuable here, in Western Canada, and particularly valuable for feeders of dairy stock. Amongst our native grasses we have many varieties of value. The native grass which most nearly resembles the valuable "Smooth Brome" I have mentioned, is a grass grown in the Rocky Mountains and as far east as Brandon. I have grown it at Ottawa. It produces a large quantity of leafy shoots. There are some grasses which, if not cut when they are in flower, cattle will not eat. There is a grass known as Blue-Joint, which is found in low lands; it produces enormous numbers of leafy stems, but few flower stocks. The leafy stems make excellent hay, and in low lands this is one of the best grasses we can grow One of the highly esteemed English grasses is the Sweet Vernal grass. This it is which gives the sweet odor to hay in England, and is due to a substance which is also found in the Tonka Bean and some other plants. One of our native grasses possesses this characteristic to a much more eminent degree than even the Vernal grass of Europe, which is not hardy throughout the greater part of Canada. In Western Ontario and British Columbia it grows pretty well, but even there it is not sufficiently satisfactory to make it worth while to grow it as a regular crop. In Canada we have a hardy grass which grows from the highest mountains down to the hottest prairies and from the Atlantic to the western border of the prairie region. This is the Sweet Grass which is woven into various articles by the Indian women. The Sweet Clover is not, as many suppose, the sweet hay of the Indians. It is also called Vanilla Grass, and in Scotland Holy Grass, from the custom of scattering it in the churches, as upon solemn occasions. It gives a character to

the hay when introduced with other grasses which no other grass can. Another valuable family of grasses is known only by its Latin name, *Muchlenbergia*, after a German botanist. Satin Grass is one of these which gives grand results. It yields a heavy crop and has fine foliage. Another is called Wild Timothy from the fact that it bears a head somewhat like Timothy. This was the first grass to call attention to the advantages of this family of grasses. In most parts of Canada we find we have some of the species. I have cultivated them and have distributed the seed, and in every district they are giving the best results. One is suitable for orchards in that it grows in the woods. Chemical analysis shows that it is superior to Timothy in its nutritive qualities. It produces a fine soft hay and a large quantity of it. It comes in in the middle of August. It is a late grass. Every grass has its own time of reaching perfection, and it is upon this that the seedsmen base their calculations in making their mixtures. It is not well to plant all one kind of grass under ordinary circumstances for pastures. Grasses for hay ought to flower as much as possible at the same time. These Muchlenberg grasses have special value because they come in at the time between the spring grasses and Timothy and the aftermath of the spring grasses produced by cutting the first crop. A grass of special value is the Canary Reed grass. It grows in low land and even in water. It produces a large amount of exceedingly good fodder. It is native in Canada, in fact many parts of the world. It is native here from the Atlantic to the Pacific, and the seeds can be gathered almost everywhere. Several farmers have told me they have grown it, and one told me that this spring he had fifteen acres of it. The Poas include the June grass, and I have great belief in the value of June grass. I find it has special value, and I believe there is no grass that will give a better supply of feed for milch cattle than this same June grass that our farmers turn up their noses at. It is identically the same, though named differently (and the treatment of it would seem to indicate that there is thought to be something in a name) with the Kentucky Blue Grass. It has been examined critically and carefully, and it is found that the Canadian June grass is not merely allied to, but is identically the same as the Blue Grass of Kentucky. Belonging to the same family is Canada Blue Grass, a native over the greater part of Canada and North America. Its chief defect is that it produces only a small quantity of hay. It grows only one foot in height ordinarily, but with good soil it will grow two feet and produce over two tons of hay. I am not aware that it has been cultivated as a crop, but it would well repay cultivation. The chemical analysis shows it is one of the richest grasses we know, and it is certainly a most valuable grass in every other respect. One of its best points is that though it grows best in rather moist land, it will stand drouth better than any grass I know. It will grow on rocky pasture and it is perhaps best suited, with Sheep's Fescue, to pick up such pastures as have been run out. Throughout the great dairying regions of the eastern townships the pastures are being fed out, and I have recommended the use of this grass to pick up their pastures. Many of the other grasses are injured by close cutting or cropping, that is they are injured by the cattle's feet. This grass will stand any amount of tramping. Now, the question is frequently asked me by farmers and others who come to Ottawa: Well, what is the use of this; are you going to give us something that is better than timothy? I am not going to give anything better than timothy, for it has special value for certain purposes, but I hold that it has not all the qualities desirable in fodder grass, and it is necessary to supplement the supply of fodder with other grasses, many of which we have native in Canada but which are neglected. The special value of timothy is that it produces fine heavy hay of regular height in large quantity and at the right season, it cures easily, presses well, is threshed out easily, and will stand knocking about. But then if you leave it a little too long after the hay is ready to cut you will not only lose a large part of the value of the hay, which will have been pumped out from the stems into the seeds, but the seeds themselves will drop out and you will have only the straw. Another special value of timothy is that it is well known, and timothy hay will be bought on the market in preference to a crop that is not so well known; but if you get a chemical analysis of the two it is not improbable that you will find the timothy less valuable for feed than the other hay, from the fact that it has been left standing too long. I had many inquiries this spring as to the time of cutting timothy. Many will tell you that it should be cut between the two flowers. Many of you will be surprised

when I say that there are not two flowers to timothy, but only one, the same as with other grasses. A farmer who was visiting me was very positive on this point, declaring that there were two flowers and that they came about a week apart. I told him that I would show him one flower in the morning and the other a few hours later. When we went out to the grass patches they looked beautiful ; the anthers had just come out from their sheaths and the appearance of the grass was purple. About half-past nine we went back. The anther had shed its pollen and there was the white timothy flower. A spike of the timothy flower has a great many blossoms and the anthers are put forth during four or five days, in fact sometimes through a week. The anthers are pushed out early in the morning and shed their pollen. The next morning the anthers of flowers later developed are thrust out in the same way. The plant is thus provided against sterility in case of wet weather even for several days together. This is not unusual in plants ; there are hardly any in which the essential organs of the flowers do not arrive at perfection at different times. Timothy has another great advantage in the fact that the seed is very freely fertilised. Some species mature very little seed, but in testing the germinating power of seeds timothy must produce from seventy to eighty per cent. in order for the seeds to rank as first-class. The seed of timothy is easily threshed and easily handled, and any other seeds mixed with it are easily detected. But while it has all these advantages, we must recognise that timothy has certain defects. In the first place there is very little pasture value in it. You cut your crop of timothy and there is very little for the rest of the year. In growing timothy with clover it is difficult except on special land to find a variety of clover that will mature at the same time as the timothy. The clover is apt to be ready a week or so before the timothy. If you cut it then you find that the bulbs at the base of the root are not matured and have not laid up sufficient material to serve as food for the plant afterwards, and besides the timothy has not the same value as it will have if you wait. But if you wait you lose the value of your clover. Another defect is that these bulbs, which are a most important part of the plant, are particularly open to the attacks of mice and insects. The mice collect these bulbs and carry them to their nests. If you turn sheep into the fields they bite too close, and thus the bulbs are injured and the plants ruined. More than that, these little bulbs are easily injured by the tramping of cattle, and it is a dangerous thing to turn your cattle into a timothy field if you wish to grow a hay crop next year. Timothy is undoubtedly the most valuable single grass we have in cultivation, but it is not perfect, and its imperfections can, I believe, be made up by some of these other grasses which are at present neglected. I believe the experiments in connection with the distribution to take place next spring will give you valuable information and lead to good results. I have here some photographs of my grass plots at Ottawa. The photographs do not show all the plots. I had one hundred and fifty patches, every one with a different variety of grass. Of these, eight or ten patches were perfectly black and dead. Many of those who came remarked that I had not cleaned up from the winter. I had no intention of cleaning up. I wanted to show that the grasses which had been sown there could not be cultivated in that soil and climate, and the object lesson of the dead patch was the most striking that could be given. In making the distribution of seeds all we ask is that the farmers who receive them will let us know the results, for we collect information not for our own use but for the use of others. The importance of grass is very great, especially to those engaged in dairying, and the information we collect showing what grasses can be best cultivated in given districts cannot but be of great value. There is an old anecdote that when a King of Italy went to Switzerland he was so much pleased with the cheese he found upon the table that he took the pains to have a specialist come from Switzerland to his own country to make there such cheese as had been given him. He gave him everything he wished to carry on his work, but it was not long before they found something amiss. They thought the fault was in the cattle, so they imported cattle from Switzerland. But this was not a complete remedy, and thinking that the fodder upon which the cattle fed was not what it should be, they brought in from Switzerland the seed of the Swiss grasses, but still the cheese was not what was desired, and the specialist at last said, ' Your Majesty, I can make the cheese as well as it is made in Switzerland if you will bring me the Swiss mountains." Each special district has its special

grasses. We have tried the English and the European grasses and find they do not produce the hay we want, and as we cannot bring England here we must take the products of Canada there. If we cannot make in Canada cheese the same as they make we need not despond, for we now know that from the produce of our own fields we can make even better cheese than theirs. For I see from the newspapers that English sellers have been detected in re-branding Canadian cheeses with English brands, thus acknowledging that our cheeses were better than their own. The excellence of our cheese is due not only to your skill but also to the good grasses which are grown in Canada and which thus have had their place in making Canada what it is now recognised to be, the producer of some of the finest dairy products in the world.

Mr. T. Lloyd Jones.—I was under the impression that the only June grass I was acquainted with was the old kind of fox-tail pussy grass, but before Mr. Fletcher got through I found that the June grass was similar to the blue grass of Kentucky. We in this section are well aware of the great nutritive qualities of the Canadian blue grass, in fact I think it is equal to the Kentucky blue grass. I merely want to call attention to the pussy grass.

Prof. Fletcher.—There is often trouble in discussing these subjects in confining oneself to the colloquial or English names of plants. That name of June grass I have heard applied to six or eight different grasses in Canada, including the blue grass of Kentucky, which grows from the Artic regions to the tropics. The grass the gentleman speaks of is what is generally known as "Pigeon Grass," and is a troublesome weed. It is, however, a close relative of the Hungarian millet, and is grown in some districts as a fodder grass.

Mr. Turnbull.—I must say I have listened with great pleasure to the remarks made by Prof. Fletcher upon this important matter. I have heard a number of discussions upon this permanent pasture question and have been recommended to obtain certain seeds. What sort of mixture would Prof. Fletcher recommend, and what address shall I put upon a letter asking for the seeds he speaks of?

Prof. Fletcher.—Send to the Experimental Farm. All letters sent to the farm go to the Director, and he distributes them to the different officers. My name is nothing at all, and it does not matter whether you remember it or not, so if you forget do not let that deter you from writing, but simply address your letter to the Experimental Farm. That question of the best mixture for permanent pasture I shall have to answer in the same way that Prof. Saunders answered the question of the best breed of dairy cattle. Different seeds are required for different districts. There are, however, some that will succeed in almost any district. One of these is the Meadow Fescue, which has been reported on satisfactorily in every case. The first year it does not always make a good growth, but the second year it does. Many grasses do not come to perfection until the third or fourth year. That is the way with June grass or Kentucky blue grass. It takes three or four years before it will make a good head, and then it will keep down every other grass. You may cut it as often as you please; it is a case of "cut and come again." When the trade get the Smooth Brome grass they will get something that will give a larger cut of fine succulent green grass than anything else I know of. It was introduced by the Experimental Farm from Germany, and it is being tried in the western States in the experimental farms there. Whether, as is sometimes the case, the cattle will tire of it I do not know. There are some grasses which at first the cattle take to greedily, but in a short time they must have a change. That is where the value of a mixture of grasses comes in. If you get a permanent pasture mixture you will find the first year a great many kinds of grass; the second year many are killed out, and very soon there is nothing left to afford a pleasant variety for the cattle feeding in the pastures. Sheep are the most particular feeders of any stock. If you notice a flock of sheep feeding you will see they are on the move all the time, while a horse or cow will stand still until it has eaten what is before it. For that reason it is important that there should be variety. The rapidity of growth in some grasses is very remarkable. The Tall Fescue and Orchard grass in damp weather will grow in a day and a night no less than four inches. These have value for that reason, because, no matter how close the cattle crop them, they will rapidly recover after a rain.

Mr. DEAN.—How long would you leave these grasses in the meadow before plowing them out? Some say that pasture lands are better after twenty years of pasturage without plowing.

Prof. FLETCHER.—I think that any farmer who leaves his pasture to run for twenty years without giving it the benefits of artificial manure would not think a great deal of his own farm.

Mr. DEAN.—But if he kept his land up would the grass come in better?

Prof. FLETCHER.—You can undoubtedly keep a piece of land in pasture. In Europe some of the finest lawns and pieces of grass are in the English parks, and on these pieces nothing but grass has been grown for hundreds of years. These have been systematically treated, and those who are in charge of these parks use a good deal of trifolium, which they sow on the surface with other fine grasses. If you keep your pasture up with artificial manures you can keep it good any length of time, but I do not think it would be wise to do so, unless you have some special reasons for keeping it in pasture.

DEHORNING OF CATTLE.

Mr. STEINHOFF presented the following resolution:

"In view of prosecutions which are now going on at London, and wordy persecutions to which our dairymen have been subjected, it is the opinion of this Association, from the known experience of large numbers of leading dairymen in Canada, United States and Great Britain, that the practice of dehorning cows is not *barbarous* and *cruel*, but, on the contrary, cows thus treated have given the best of results, and the determination of thus treating cows should be left to the discretion of the owners."

He explained that a number of cows had been dehorned in the vicinity of Brownsville, Oxford County, and the dairymen who had thus treated their cattle were being sued, and he thought the Association should express its opinion upon the subject.

The PRESIDENT stated that, as the subject was one of interest to farmers, he had allowed the resolution to be introduced.

Mr. JAMES HOPKINS seconded the resolution, which, after a short discussion, was laid upon the table.

The auditor's report was then presented and adopted.

AUDITORS' REPORT.

To the President and members of the Dairymen's Association of Western Ontario:

GENTLEMEN,—We the auditors of your Association for the year 1891, beg to say that we have examined the books of the Treasurer for the current year, and have duly examined and compared the same with the vouchers and found them correct, showing a balance of $290.42, for which the Treasurer produces a marked cheque on the Imperial Bank, Ingersoll. The following is a detailed statement of receipts and expenditure.

RECEIPTS.

Cash on hand from previous year, as per last report	$222 54
Members' fees	148 00
Legislative grant	2,500 00
M ney received from prosecutions, consisting of fines and costs	568 50
Money borrowed for current expenses	293 20
Received from factories for Inspectors' fees	612 50
Total	$4,344 74

EXPENDITURE.

Grants to other societies, fairs, etc	$200 00
Expenses for conventions or regular meetings	228 35
Officers' salaries, $238; Directors' fees and expenses, $133 78	371 78
Postage, stationery and printing	100 93
Inspectors' salaries, $2,058 33; other expenses of Inspectors, $75 29	2,133 62
Cost of reporting	80 00
Paid for loans	300 00
Miscellaneous, Secretary's office	9 10
Costs paid by Inspectors in prosecutions against factorymen, including R.R. fare, witnesses, etc	394 04
Supplies and apparatus for Inspectors' use, such as tests, etc	236 50
Total	$4054 32
Balance	$290 42

JOHN ROBERTSON,
J. S. PEARCE. } Auditors.

BRANTFORD 13th day of January, 1892.

On motion of Mr. Robertson the report was adopted.

The Convention adjourned until the evening at 7.30 o'clock.

EVENING SESSION.

Preliminary to the regular proceedings an exhibition test of milk was made with the Babcock instrument by Mr. A. T. Bell. The operation was watched with keen interest by those present. The sample of morning's milk showed 5.40 per cent of butter-fat, and that of evening's milk 5.50 per cent of butter-fat.

The PRESIDENT.—This will be essentially a cheese-makers' night. First we are to have Mr. Bell's report on the Dairy School at Tavistock, after which there will be a discussion on that report and also on the report of the different inspectors. We have distributed blank papers, so that any person who desires to ask a question and does not wish to stand up and put it, may have the opportunity of asking for any information desired. Cheesemakers have complained, and I think justly, that hitherto there has not been the attention given to this part of the proceedings that there should have been.

THE DAIRY SCHOOL AT TAVISTOCK.

Mr. BELL read the following paper :

At a meeting of the Directors of the Western Dairymen's Association, held at the Tecumseth House, London, on the 12th day of March, I was appointed Instructor for the Dairy School, which was then being established under the control of this Association, and the factory at Tavistock was selected as the Dairy School over which I was to preside. The factory began operations on the 23rd April, and from that date until the close of the season, 13th November, was open to pupils from all parts of the Province, and in all 105 pupils attended, and they came from all sections covered by this Association. They were given instruction in the most improved methods of cheese-making, and taught the use of the Babcock milk test and Quevenne lactometer. The Quevenne lactometer is an instrument for determining the specific gravity of milk, and by using it in conjunction with the Babcock tester we are able to determine the other solids in milk besides fat. Pupils were allowed their own time in coming and leaving, but most of them remained about two days. Milk testing was carried on every day, as well as the manufacture of cheese.

The milk inspectors and cheese instructors appointed by the Association spent one week at the Dairy School before entering upon their duties, to get thoroughly acquainted

with the use of the Babcock test and lactometer, and continued to meet once a month for the remainder of the season, along with one or more of the Executive Committee, to compare notes and discuss practical matters, so that a perfectly uniform system of instruction might be pursued.

In consequence of my time being fully occupied in giving instruction to pupils during the early part of the season, not much was done in the way of experimenting until the season was considerably advanced. We then procured two small vats, and conducted a series of experiments.

First. To establish positively the quantity of cheese from milk according to the percentage of fat, the result of which is found in a table in my report, which shows very decidely the injustice of the present system of pooling milk, and the total absence of any stimulant to patrons to improve the quality of their milk.

Second. We also made several experiments with different quantities of rennet, which confirmed our previous experiments, at one time conducted at considerable length when managing the Black Creek factory, but at neither factory was the quality or yield of the cheese in the least affected by an extra quantity of rennet, though using in some cases double the ordinary quantity.

Third. Temperature at which vats ought to be heated in cooking curd. Old cheese makers considered the heating of the vat to a temperature of 96° to 98° as indispensably necessary to the producing of fine quality of cheese. Our experiments show that fine cheese can be made by heating to 90°, and that neither time, quantity or quality was perceptibly affected by the lower temperature, and upon testing the whey with the Babcock test we found that the fat in the whey was no more at 98 than at 90°; in fact time, quantity and quality were not perceptibly affected by the different temperatures of heating. And while we found at the temperature of 90° satisfactory results were produced, that at a lower temperature satisfactory results cannot be obtained.

Turning again to the question of yield from different per cent. of fat in milk, I will not trouble you with the details of all the experiments, but we will select two that we were able to confirm by other tests with milk of the same quality.

The method of making the test was as follows :

We selected the milk of patrons that we expected, from our previous knowledge of them, would be sending the poorest milk, and we weighed 500 lb. of this milk into one of the small vats. Then we selected the milk of patrons that we expected would be sending us the best milk received at the factory, and we weighed 500 lb. of this milk into the other small vat. We then tested the milk of the two vats, and found the vat with the poorer milk tested 3.40 per cent., and the vat with the best milk tested 4.10 per cent. The vats were then set when ready and treated in every respect as nearly alike as it was possible to handle them. They were then put into the Curing Room and weighed. Then again at two weeks and one month old. Again weighed at the end of two months. We found the cheese made from the 3.40 per cent. milk weighed 48 lb., and the cheese made from the 4 10 per cent. milk weighed 56¼ lb. The shrinkage in both lots was the same (about 3 lb.)

The table which I spoke of gives the yield of cheese per 100 lb. milk, and number of lb. milk to a lb. of cheese, which show very clearly the yield according to per cent. of fat.

From 100 lb. 3.40 milk we have 9.60 lb. cheese, or 1 lb. cheese from 10. 41. lb. milk
From 100 lb. 3.50 milk we have 9.75 lb. cheese, or 1 lb. cheese from 10. 25. " "
From 100 lb. 3.60 milk we havo 9 81 lb. cheese, or 1 lb. cheese from 10. 19. " "
And from 100 lb. 4.10 milk we have 11.25 lb. cheese, or 1 lb. cheese from 8. 88. " "

The increase in weight of cheese is scarcely in proportion to the increase in per cent. of fat, but is so nearly equal that it would o nly be necessary to sell the cheese made from the richer milk at 3-10 of a cent more per lb. to make the price of fat equal in both cases, which, I think, could readily be done, owing to the superior quality of the cheese made from the richer milk.

Should the Association continue the Dairy School, I would suggest that all the experimental cheese, and as many ordinary cheese as may be found necessary, should

become the property of the Association, so that pupils might have an opportunity of seeing the cheese bored to a larger extent than otherwise can be done where the cheese have to be marketed in the usual way, as buyers would object to cheese being bored much. Still, we think the loss, if any, would be very small, and the advantages to pupils very great, as they would then have a chance to examine the cheese and observe quality which the market requires.

Great complaint has been made by buyers that early cheese have not been showing sufficient quality. We have never found any difficulty in producing the quality of cheese that the market requires, and which, we understand, have always given satisfaction. After receiving the milk at the factory we make use of what is known as the rennet test to ascertain when the milk is in proper condition for the application of the rennet. When this stage is reached we use plenty of rennet, enough to coagulate fit for the knife in twenty minutes or less. Cut very carefully and not so fine as later on in the season. More moisture can be retained by so doing. Heat gradually to a temperature of 94° or 96°. Dip on the first appearance of acid by the hot iron test. Do not stir as much as you would in summer. Pack the curd, turning occasionally to let whey escape, keeping it quite warm. Put it through the mill early, say about three-quarters of an hour before salting; by doing so the cheese will have a firmer body. Salt from $1\frac{1}{2}$ lb. to $1\frac{3}{4}$ lb. per 1000 milk. Press very gently at first, and when taken to the curing room, keep at a temperature of 70° and you need not fear results for early cheese. From the 1st of June, or the summer months, use less rennet, except when milk is very ripe, then use double ordinary quantity. Cut somewhat finer. Stir the curd a little more before allowing to mat. Grind earlier. Aerate curd well after grinding. Salt a little more, say $2\frac{1}{4}$ or $2\frac{1}{2}$ lb. to 1,000 lb. milk. Temperature of curing room should be about 70° to obtain best results, but, as the most of you are aware, it is next to impossible to have the temperature kept down to 70° for any great length of time during the summer months. But if the curing room is watched very closely, windows opened at night and closed tightly during the heat of the day and light excluded, a great deal of the difficulty may be avoided.

For fall cheese I would not advise very much change. Do not grind quite so early, for there is a danger of the curds getting too cold in some of our factories by grinding early, which must be guarded against. Salt a little higher as the yield increases, and about the curing of fall cheese I cannot emphasise too strongly the great importance of having the curing room at the proper temperature. Many of our best cheese are spoiled for want of heat. The temperature should not be below 60° nor above 65°. Our experience demonstrates that those are the most suitable temperatures for fall cheese.

I find it a good plan to place the new cheese on the top shelves. When taken into the curing room they require a little more heat to get them started in the curing process. After being on the top shelves for five or six days they can be moved down as room is required. The month's cheese will be more uniform than if placed on the shelves regard less of position.

And now about losses which do occur in handling milk and curd. When milk is received too sweet for the application of rennet it should be heated and stirred very gently while ripening. If stirred too much it is apt to churn it some; if not stirred enough the cream becomes a little tough and can never again be wholly incorporated with the milk, hence a loss. And in the application of rennet be sure and add plenty for a perfect coagulation; if not, there will be a waste.

Do not leave the curd too long before cutting. If left too long it is apt to break before the knife in different directions, and good results will not follow. Start to cut a little on the soft side, and take plenty of time. Deal gently with it, for you cannot afford to use it harshly. Strive to have the whey clear. You should not have more than 2-10 of 1 per cent. fat in it. When ready to dip, if at all soft, stir but very little. Rather break it over afterwards for the liberation of the whey.

Then, again, we find considerable waste of fat from cheese occasionally on the press boards. My experience tells me the chief cause for that is in grinding curds when too ripe. When ground earlier and stirred the particles of curd heal over, so to speak, and

will stand a good pressure without any apparent loss; also, they will stand extreme heat in the curing room better. Now all those losses can be avoided by aptitude and close attention.

And now about boxing and delivering cheese. Every manager of a factory should have sufficient pride in the reputation of his factory to see that the cheese were carefully boxed and shipped. Boxes shaved down nicely and double scale-boarded. I happened to be at a depot where cheese were being shipped this fall, and took off a few lids, and the rim of every box stood up about an inch above the cheese. Now this should not be the case; it only recoils back, to the injury of the factory and manager from whence the cheese came.

Everything relating to cheese making should have the closest attention from the cow to the car.

All of which is respectfully submitted.

QUESTION AND ANSWER.

Mr. J. F. Williams.—What temperature do you get the best results from in setting?

Mr. Bell.—From 84° to 86°.

Mr. Williams.—Would you not say a higher temperature in the fall of the year?

Mr. Bell.—It depends a good deal upon the kind of factory. If you have a cold factory, I should say a little higher.

Question.—Which knife do you use first?

Mr. Bell.—The horizontal knife.

Mr. Williams.—Are you troubled with mould in your factory and is it objectionable?

Mr. Bell.—We are never troubled with mould. We were in the Blandford factory. I have heard buyers object to the cheese because of the mould, but I do not think it affects the quality.

The President.—It is desirable if possible to avoid the mould and it can be avoided by having the factory properly constructed.

Mr. John Podmore.—One idea that struck me favorably in Mr. Bell's paper was that on high and low cooking. He has modified his views as to reducing the temperature from 98° to 90°. He says now that cooking not over 90° the results are unfavorable. Why would not 86° do? If you set the milk at 82° or 84° and then cook in something under 90° why would not the results be as good? We have made some experiments in setting in the West Oxford factory. We still have some of the cheese made in our factory, some of the low cooking process and some at 98°. They were made in November and the cows had been fed turnips. They do not have the turnipy flavor, and, as regards texture, the average of the low cooking was better and there was more meatiness and a more silky feeling. As we all know, oils will melt at 98°. If so, what is the object of keeping up heat to 98° when there is a certain portion of the oils running away in the whey. What is the cause of our whey vats, standing outside the factory, having 2½ inches of fat on top? That ought to be in the cheese. I am glad to see that Mr. Bell has partially admitted that he was mistaken and will modify his views to 90 degrees.

Mr. Bell.—I would not advise scalding lower than 90° without further experiment. We have some that is scalded at 90°, but below that, at 86° or 87°, the cheese was mushy. As to the oil running off in the whey, we tested the whey with the Babcock test and did not find any more in that scalded at 98° than in that scalded at 90°.

The President.—I was struck with one thing in the report which was different from our preconceived idea. I would have supposed that scalding at 90° the curd would have taken longer to mature, but I understand the report to say that neither in time

nor in quality was there any difference as compared with that of 96° or 98°. We are following the old English Cheddar process, the essential principle of which was, by scalding to a certain temperature, to cause the separation of the whey from the curd. The report says the cheese matured as quickly at the high as at the low temperature and without waste. I would have supposed that there would have been waste at 98°. Only since we have had the Babcock test have we been able to make sure of the tests in this case.

A Voice.—What advantage would there be in heating higher than 90° ?

The President.—This is a new idea and we want to move slowly. The old Dunlop system did not raise the temperature. The Cheshire system was the same. Under the Cheddar system it was considered an essential principle that heat should be applied to expel the whey from the curd and ripen it. My recollection of the Dunlop is that you got a cheese that was longer in ripening and in the cold weather it was inferior, and you had no such uniform quality as since the Cheddar process was introduced.

A Voice.—Was there any difference in the ripening of the curd according to the hot iron test, as near as you could tell ?

Mr. Bell.—According to the hot iron test the low temperature came right along as well as the high temperature.

Mr. Williams.—Describe the method of handling the curd after it is in the curd dryer, after you salt it.

Mr. Bell.—In the summer months after we dip the curd into the sink we don't allow it to mat in large flakes as some do. We keep turning it as the whey gathers, so that the whey will keep running away from it and we keep piling it up a little deeper as the whey runs out. We grind it about half way from the time we dip until we think it will salt. After grinding we stir it, and if it is a gassy curd we pile it up as deep as we can in the centre of the sink until it has a velvet feel when we spread it out and salt it.

A Voice.—What mill do you use ?

Mr. Bell.—A Whitelaw Woodstock mill ; it is a knife mill.

A Voice.—A gassy curd you do not spread so much.

Mr. Bell.—If we see we are going to have a gassy curd, we will ripen it a little more and have it work off faster. From the time we put in the rennet we expect to dip in two hours and a half.

A Voice.—After what time do you put it in the hoops ?

Mr. Bell.—About three hours from the time we dip. If it has ripened too much I find we have not good results if it dips less than two hours and a half from the time we put the rennet in.

The President.—You would rather have the milk too sweet than too sour ?

Mr. Bell.—Yes.

The President.—That is a sound principle as far as my experience goes.

A Voice.—How much acid does it have when you dip, according to the hot iron ?

Mr. Bell.—In the spring you can scarcely see it, but as the summer advances we will have probably one-eighth or one-quarter, say one-quarter for the summer months.

A Voice.—How much does it have when you salt it ?

Mr. Bell.—It will go about 2½ or 3 inches. That depends a good deal on who has got hold of the iron. Some can make it an inch more than others.

A Voice.—Do you wait for the change at that stage ?

Mr. Bell.—No, we do not go by the hot iron test altogether. We generally wait for the silky feel on the curd before we salt.

A Voice.—What is the greatest per cent. of fat found in your whey ?

Mr. Bell.—Three-tenths of 1 per cent.

A Voice.—Would you feel satisfied with that?

Mr. Bell.—No, I never felt satisfied when it went over two-tenths.

A Voice.—What was the cause of the three-tenths; was it the conditi n of the milk or the way it was handled?

Mr. Bell.—I think it was more in the way it was handled.

A Voice.—Is there more loss in a gassy curd than in a good curd?

Mr. Bell —Yes.

A Voice.—What quantity of extract do you find it best to use?

Mr. Bell.—Extracts vary so much in strength that it is hard to say. I would use enough extract in the spring for co-agulation fit to cut in twenty minutes from the time the rennet was added, and in the summer in 30 minutes.

The President.—Do you find that the quantity of rennet makes any difference in the quality or quantity of the cheese?

Mr. Bell.—Our experiments go to show that it has no effect.

The President.—There has been nothing more unsatisfactory than the early cheese of Western Canada. The time was when they were fearfully bad, and even yet they have not the quality they should have. The fact is they are not as rich as they should be. The American early cheese are worth more money and sell for more money in England than ours do. I have been in England when the early Western cheese were arriving, and I heard so much about their bad quality that I wrote from England to the press in Canada recommending cheese-makers to use more rennet and less salt. Be sure that you have fat cheese, for nobody buys early cheese to hold it for a day; it goes at once into consumption. Mr. Podmore, who is present, I have no doubt will endorse what I say with regard to early cheese. The importer knows to a day when the cheese will arrive in England and he has to sell them to arrive. If they do not arrive on Thursday your customer will not take them on Friday; the market is usually declining every day at that season of the year. The rennet does not injure the quality. Prof. Robertson made some experiments which disappointed himself for he had thought the quality would be affected. Salt light; keep the curd warm. We have the cheese matured, but they are not sufficiently pressed. Press them as long as you can, and turn the cheese in the morning and press them again; press them carefully, and there is no reason why we should not have solid cheese. These large ragged holes are most objectionable, but above all our cheese is too poor. Keep it warm in the curing room. In the spring you must be careful to keep up the temperature in the curing room. Do not over salt it, not more than 1½ pounds to the thousand pounds of milk. It is important also, as I say, to have the cheese solid. These ragged holes give it a very bad appearance, and put down the price. The mills used have something to do with it. It is perhaps more difficult to get a solid cheese with the Harris mill than with any other. There are those who use it and get their cheese perfectly solid. More care should be taken in the pressing. Keep them in the press as long as you can. I have gone to factories and seen cheese put to press at 7 o'clock in the evening and found them on the shelf at 1 o'clock next morning. The maker always had some reason for this; he was always busy, with this or that to be done. There should be no such reason found. A man who is not an enthusiast, a man who would neglect anything in cheese-making, ought not to have the management of a factory, for there will be bad goods and low prices as a consequence.

Mr. Ashley.—How long has it been the case that an American early cheese has sold for more money than ours?

The President.—I think always. Our fall cheese have given us our reputation. I have been in England, not once or twice, but many times when the early cheese were arriving and found it the universal complaint. I have no doubt that Mr. Podmore will endorse everything I say.

Mr. PODMORE.—It is the case every year. Mr. Grant has written me: "It is no use telegraphing about your early cheese; we have to leave you alone until you get grass cheese."

The PRESIDENT.—In the middle of June last year I was there and found half-skims coming from New York and selling for more money than our early cheese.

Mr. ASHLEY.—We found that in our section Mr. Aird said he did not want the boxes branded. I think I can understand that, for if they have a choice factory the English buyer does not know what it is and cannot buy direct. But if the boxes were branded, the good factory could deal with the buyer direct and perhaps get a better price.

The PRESIDENT.—I do not think the buyers have any objection to having the factory known to the English buyer. But a very small percentage of our factories are uniformly fine. If a brand is put on the cheese, word would be sent up to buy that factory that is the best, and they will not take any other. But the difficulty in any factory may be only temporary and next month the output may be of fine quality. They have written to us for years after some inferior goods have been sent to them not to buy that factory, although its output may now rank as the very finest. If cheese was inspected like flour we would have a standard, which would be a great advantage. In no place in America is so much paid for inferior goods as in Canada, because a percentage of our factories being of established quality, the reputation of our cheese generally is improved, and so the inferior goods get the benefit.

A VOICE—I am a little puzzled with this rennet question. If I understood Mr. Bell aright it made no difference in the time of ripening what quantity was put in. But if I understand the President, he says, in the spring put in plenty of rennet and salt light. If the rennet has no effect in ripening, I do not see why use more, but I can see it would be well to use less salt.

The PRESIDENT—In the spring it retains the moisture better. It used to be that there was hardly a factory but you would find their cheese leaking whey, but the moment we changed to a larger quantity of rennet that difficulty was cured.

Mr. WILLIAMS—How do you mean that the cheese were full of ragged holes?

Mr. BELL—Chiefly from want of maturing the curd.

The PRESIDENT—And pressing.

Mr. BELL—And pressing of course, but the chief cause is from not maturing the curd properly. The salting is done too soon without leaving them long enough to get the velvety feel. When I ripen the curd properly I have no ragged holes in the cheese but I have them if I salt too early.

A VOICE—Do you get down to the silky feel in April and May as soon as you do in the summer months?

Mr. BELL—Not quite.

A VOICE—What is the cause for a less price for November cheese than for September or October?

The PRESIDENT—Just because they are not so fine. That of course raises the question, why? There is food given to the cows in November that affects the quality of the milk. But I have seen November cheese which is just as fine as September, and for which I have been willing to pay as high a price. The cows are apt to be fed roots and turnip tops, which is the worst food I know of. We bought a very large factory, September and October, but did not take the November because we expected the cows would be poisoned with turnip tops, but, in this case the maker used a little saltpetre and the effect was to remove the taint, and the cheese was perfectly made. We paid the same price for the November cheese as for the September and October Our November cheese should be the best. The milk is richer then and, if there is anything in what we are told about the quality of milk affecting the cheese, we ought to get the best cheese in November if we have a proper curing room. I saw these November cheese last June in London in the establishment of the most particular buyer, the one who requires the finest cheese, and he told me that they were as perfect as Cheddar cheese.

A Voice.—Would you advise against feeding turnips in any shape?

The President.—In the case I speak of the maker used something to counteract the effect. I think that roots fed judiciously, just after milking, do not seriously hurt the milk. But I would rather not have turnip tops used. It is miserable farming where they are fed, for they are worth more to plow them under. Of course cows will milk better with a percentage of roots. I think you could feed quite well a bushel a day just after milking without any injury to the milk. I am now sending butter to Toronto and getting 25 cents a pound from Mr. Park. I feed a bushel of roots a day.

A Member—I milked about 50 cows this summer and in the fall we fed turnips in the afternoon, but never allowed the cows to eat turnips in the day time. The chewing of the cud has the effect of doing away with the smell of the turnip to a large extent.

Mr. Ashley—I think our farmers should get into the way of growing the sugar bee It does not affect the milk and you can grow as much as you can of mangel-wurzel.

QUESTION DRAWER.

The question drawer was then opened, and the questions were read by the President and answered, as a rule, by Mr. Bell.

Question—Do curds stirred with agitators require more salt than those raked with the hand rake?

Answer—I would not advise more salt but I would cut them a little finer.

Question—Was the average any better at 90°?

Answer—No, the average did not seem to be affected. It was about the same at the different temperatures.

Question—How do some makers get through in the day time while others take the greater part of the night; also, has the use of thick milk to hasten the ripening any affect upon the cheese?

Answer—I would hardly undertake to answer the first question. I remember using thick milk once, but I fancied I could see the specks in the curd and also slightly in the cheese.

Question—Do you approve of giving some milk age sufficient to hasten the ripening?

Answer—Yes, I would keep it over.

Question.—Do you prefer that to heating it up?

Answer.—Yes; late in the fall when the milk arrives sweet it is almost necessary to keep it over. By heating the milk up you cannot get it ripe until after dinner. By keeping milk over you get a good start in the morning, and you have just as good results

Question.—Why is it that the report of this Convention is not issued earlier in the season?

Mr. James.—I do not think that any blame should rest upon the Association or upon the reporters in this matter. As you know the Government has its printing done under contract with one firm. We have two Dairymen's Associations, the Creameries' Association, two Poultry Associations, the Bee-keepers, the Fruit Growers, the Entomological Society, the Agricultural College and two or three others, all of whose reports come in about the same time of the year. We have at present passing through the press the Fruit Growers' and Entomological Society (and, by the way, that is another), and we have the manuscript waiting for the College report and it must be got out before the House rises or we will get no grant. Your report will come next. The report has to be read in manuscript and again in proof two or three times, and as we have not a large staff the work is very heavy. I assure you that we will do our best to get the report out in good time.

Question.—If the milk is extra good say in the fall, would you set as soon as in hot weather?

ANSWER.—I have never been in the habit of making any difference in the time of setting between the fall months and the summer.

QUESTION.—Please explain the way the rennet test is used?

ANSWER.—We heat all our milk to a temperature of say 86°. We take 8 ounces of that milk out in a glass jar, take a drachm of the extract and put it into the milk and stir it, and if it thickens we will put a little stick, a piece of burnt match, or something of that sort, stir it round and if it stops in 22 seconds, or say 20 seconds, it is ready to set. Some use four ounces of milk. It does not matter, for then of course you use less extract.

QUESTION.—Is there any reason why paying for milk according to quality instead of quantity cannot be introduced, thus doing away with the employment of inspectors, and not only saving the Association but the factories interested the amount of their salaries and expenses, besides having a system that would prove more satisfactory to the patrons?

ANSWER.—It seems to me to be the just method from our experiments. There is an increase of cheese according to the percentage of fat and we found, in making out the table, that we would have to sell the cheese of the poorer milk at three-tenths of a cent per pound more to make it even with the other.

The PRESIDENT.—I would like to call your attention to the figures that Mr. Bell presented to you. He told you that 100 pounds of milk at 3.40 per cent. of butter-fat would make 9.60 pounds of cheese. That is, it would require 10.41 pounds of milk to make one pound of cheese. At 3.50 per cent. 100 pounds would make 9.75 pounds, requiring 10.25 pounds of milk to make a pound of cheese, and at 3.60, 100 pounds would make 9.81 pounds of cheese or 10.19 pounds of milk to a pound of cheese. At 4.10 per cent. of butter-fat, 100 pounds would make 11.25 pounds of cheese, requiring 8.88 pounds of milk to make 1 pound of cheese. If that is reduced to money value you see the injustice of the present system. Mr. Bell took a few of the patrons, who, to his knowledge, delivered the best milk, and found that they averaged 4.10 per cent. Compare that with the milk at 3.40. A thousand pounds of milk at 3.40 on the basis of 10 cents a pound for the cheese would have yielded $9.59, while the milk at 4.10 per cent. would yield $11.24.

QUESTION.—Will the butter-fat melt at a low temperature in the spring when the cows are fresh and fed on fodder?

The PRESIDENT.—I was complaining of the poor quality of the early cheese, and assumed that it was because the milk was poor in the spring, but the Babcock test last year showed that the milk then was richer. It actually got poorer when the cows got to the grass, corroborating what Prof. Dean showed this afternoon, that in their experience the leanest and poorest cows, while taking 12 pounds of grain a day, gave the best milk.

Mr. DILLON.—In April I visited a number of factories that were making April cheese, and when I tried the cheese it seemed to me to lack fat. It appeared to me the fat had been melted, and had gone out, or that it had never been in the milk.

The PRESIDENT.—There may be something in what you say, but Mr. Bell's experiments showed that the heating did not affect the percentage of the butter fat in the whey.

Mr. DILLON.—That was in the fall. Prof. Dean showed that when the cows were fed on a thin ration the butter-fats melted at a lower temperature than on the other ration. I think the butter-fat melts more readily in the spring.

The PRESIDENT.—That is an important matter to follow up and experiment on.

Mr. STEINHOFF—Was it in spring or summer that you found that $\frac{3}{10}$ of 1 per cent. of fat in the whey?

Mr. BELL.—In the summer. I got one in the fall too, but most of our tests ran $\frac{2}{10}$ of 1 per cent.

The PRESIDENT.—I have not found Mr. Bell's cheese in the early part of the season deficient in fat. He was in the habit of scalding at 96° I believe.

Mr. JOHN ROBERTSON.—There is a point or two in connection with this cheese-making which has not been very well gone into. The whole discussion, as far as my mind has been able to take it up, has been on the question of fat in the early cheese. I have seen early cheese made that was just as described; there was no fat wasted, it was all kept in the cheese. But there is danger of the curd being made too dry, and not having the proper proportion of moisture which would give the softness to the texture better than it would have done if there had been a little more fat and less moisture. There is a good deal of guess work about dry cheese and what causes it. Governor Hoard last year brought up a question which I have never got to the bottom of. It was called to your attention to-day that 31 per cent. of water, 31 per cent. of curd, and 31 per cent. of fat was allowed to be about the proper proportion for a fine cheese. But if the moisture is not there in proper proportion you must have a stiff hard cheese. The fat will be there but it will not show unless you melt it.

The PRESIDENT.—The remarks of Mr. Robertson confirm our experience that while it is important that these discussions should be held and the cheese-makers informed as to the points of their business, mere discussion is not everything. It is only by actual demonstration and practice that a thing is really learned.

QUESTION.—How long should curd remain in the whey to produce the best results

ANSWER.—That is after they are cut I suppose. About two hours from the time you cut the curd until they are dipped.

QUESTION.—How much acid would you dip a gassy curd with?

ANSWER.—It depends a good deal on the condition of the milk. If you have ripened your milk a little more, I would dip with the same amount of acid as I would a good curd. But if it is working a little slow I would give it more acid. The best plan is to get the milk ripened up a little.

QUESTION.—During the last season we have had more trouble than ever before by having the cheese too high for boxes. Will Mr. Ballantyne tell the cheese-makers of the great injury they are doing the trade and ask them for goodness sake to improve in this way and get the boxes to fit the cheese.

The PRESIDENT.—That is emphatically put, but it cannot be too emphatic. You should feel a personal pride in everything relating to your factory, and if you do not, and will not try, the sooner you quit the business the better, because you will be a failure. I have pitched into factories, particularly the co-operative factories, for reducing the price of making when the maker had to find the boxes. There is some improvement in that respect. Do not try to save by putting the cheese into boxes that will not fit. Try to get a fair price for your labor, but do your work right and never make low wages an excuse for defects. When I find fault they tell me sometimes that I am the only one that complains, that other buyers never object if an inch or two is wrong in the boxes They say we are too particular, but we never want anything but what is right.

QUESTION.—Please ask Mr. Podmore to explain to the cheese-makers and factory men the best method of marking the weights of cheese on the boxes.

Mr. PODMORE.—Several customers on the other side asked me to have stencils used. (Mr. Podmore exhibited to the meeting samples of stencils suggested, consisting of ordinary sheet stencils having the numbers from 64 to 75.)

The PRESIDENT.—This is a simple and efficient thing and can be got by all. In case I should forget it, I should like to say here that every maker should put the date upon every cheese in the factory. When a maker does not do that it shows that he is careless. It is impossible that he can keep the record of his cheese or know what he is doing without such marks. You should get such stencils as these and mark the date upon every cheese, then, if anything is wrong you can turn to the diary and get the record. We put the number of the vat and the day of the month upon every cheese. It makes the cheese-maker attentive and careful.

Mr. PODMORE.—Another important thing is to put the cheese up in nice tasty style.

It does not do to have an 80 pound cheese in a 64 pound box. We have had repeatedly to buy boxes and repack, or we have had to cut down the box to the level of the cheese. A little colored paper about the cheese, or a picture, something of that kind takes the eye and sells the cheese better. Another thing that should be remedied—and everyone who ships cheese will bear me out—is that there is often a difference in the invoice we receive from the factorymen and the way it is marked on the boxes. We have adopted the plan of checking over the weights. The difference is to a certain extent dishonest. We have had cases where there was as much as 200 pounds difference in the car-load of cheese. We have had half a dozen reclamations because of these differences in the figures.

The PRESIDENT.—I have had the same. I have had a difference of as much as 200 pounds in a factory.

Mr. PODMORE.—There should be the most implicit confidence between buyer and seller, but if this is to go on we must go to the factories and take the weights off as we did 10 or 15 years ago. Then there is another little matter. Some years ago the party in charge of the factory used to go to the station where they were making delivery and see that the goods were delivered in proper shape. If a box was broken he would get another. Rut there are so many stations now that this is not done.

QUESTION.—Do you prefer using rennetine rather than extract and do you use enough for coagulation in 30 minutes when the rennetine is used?

ANSWER.—It has been my custom to use the rennetine, but I cannot say I prefer it to good rennet extract. My cheese from the rennetine is as good as from any extract I have used.

Mr. ROBERTSON.—Is there any difference in the cost?

Mr. BELL.—I find the expense about the same.

QUESTION.—Will an extra quantity of rennet extract hasten the curing process?

ANSWER.—From our experience that does not seem to be the case; with a very small quantity the cheese was cured as rapidly as with a larger quantity.

QUESTION.—How often do you cut with a perpendicular knife?

ANSWER.—Twice.

QUESTION.—Do you cut your curds soft?

ANSWER.—We cut our curd a little on the soft side, I think softer than the general rule as far as I can find out. I like to take it a little on the soft side and take plenty of time. When the curd thickens too much it breaks a little before the knife and you do not have the same results, and you often have "riley" whey from that cause.

QUESTION.—Do you recommend giving a curd you know to be gassy more acid before dipping than you would a good curd?

ANSWER.—I would not give them more acid if I could ripen the milk. I am not an advocate of putting on much acid before dipping.

QUESTION.—Would you cut the curd finer in vat when just heating to 90?

ANSWER.—Yes. I would prefer cutting it a little finer.

QUESTION.—Please state the per cent of fat in the drip or strain from the curd, as it appears to be a waste of actual cream. Is not this rich-appearing waste the result of cream being allowed to rise in the night's milk over night?

ANSWER. —No, I do not think so. I think there is a certain percentage will run off when you are ripening your curds. In testing the drip at the end of the sink I have found as high as three per cent after the curd has been matured. Soon after dipping we tested and did not find any at all.

QUESTION.—Which is the more profitable, the cream gathering system or sending the whole milk?

The PRESIDENT.—Prof. Saunders showed that there is a larger per cent of butter-fat under the cream-gathering system where the machine is used. You get a more perfect separation of the cream that way.

Mr. Dillon.—But there is more expense in taking the whole milk. I think it would take some time to test that fully.

Question.—Will Mr. Dillon tell us how he is getting along at Mount Elgin with his winter dairying, also what he thinks of it from a paying stand-point?

Mr. Dillon.—We are getting along better that I expected. We started on the 15th of December, and in that month we made 5,891 pounds of butter. The quality is a long way ahead of what I had hoped to find it at that season.

The President.—How are your farmers satisfied?

Mr. Dillon.—The farmers have had no return yet, and it would be a difficult matter to answer that part of the question now. Those who have been sending milk are well pleased with the skim milk they have received. There are two of the patrons here and I would like to hear them express their opinions upon the matter. I have understood from different parties that the skim milk has been sufficiently valuable as hog feed to pay for the extra feed they have to give their cows, and they find their cows in better con dition than they would have been had they let them go dry and not given them the extra feed.

Question.—What is your yield?

Mr. Dillon.—One pound of butter to 21 $\frac{28}{100}$ of milk during the summer. That requires some explanation. When we took charge of the factory the boiler and engine were in a bad state of repair. We did not understand it, and for two days it was out of order and we could not do real good work. We got 10,000 pounds of milk one day, and it requires a good deal of steam to heat so much, besides running the separator. We were much hindered in our work, and were not able to get as perfect a separation as we do now.

Mr. Williams.—Give us the result of your experiments in low heating; was it satisfactory?

Mr. Dillon.—That is a very important question; I would not like to say that cheese-makers should adopt my idea. In carrying on my experiments I would weigh the milk into one vat and mix it, and then weigh it into the three compartments and I cooked the curds in the different compartments, one at 84°, another at 91°, and another at 97°, I generally found a little better average from the lower cooking, but the difference was not so much as I had expected. Sometimes I used more salt. Where I did not, of course the cheese were not as firm in body.

The President.—At what season did you make these experiments?

Mr. Dillon.—During the month of August. I cooked up as high as 103°, but I would rather have it at 91° than 103°.

The President.—We admit, of course, that that is too high, but did you notice any difference between cooking at 84° and 91°.

Mr. Dillon.—Yes, the difference was in favor of the higher cooking.

The President.—You found you could get good cheese at 91°?

Mr. Dillon.—Yes; I believe that 92° is the proper degree.

Mr. Hopkins.—How long did you leave your whey?

Mr. Dillon.—About one hour after it was heated until the whey was run off.

Question:—Do Mr. Dillon and Mr. Bell approve of putting pure warm water on a gassy curd?

Mr. Dillon.—It is a practice I have very seldom indulged in. The only benefit I could see in it is that it may wash a little off the outside, but it cannot affect the flavor while it must reduce the average. A man can tell by the smell if his curd is going to be gassy. He should know it in the milk and should not work the curd so dry.

Mr. Bell.—I can corroborate Mr. Dillon's statement in regard to putting water on the curd. I have done it with good results, but I do not approve of it as a general thing, as it hurts the average.

The PRESIDENT.—When would you apply the water?

Mr. BELL.—Just at dipping.

The PRESIDENT.—At what temperature?

Mr. BELL.—At 98°.

The PRESIDENT.—In connection with that my attention has been called to cheese we have made of the worst possible curd, but so treated that I defy the best expert to detect anything wrong. You do not get the fine aroma, but you get rid of the bad flavor. My experience is if you have a gassy curd it is better to be sure and wash it.

Mr. DILLON.—I think the proper time to wash a curd so as to get the best results is to run the whey down, then have a barrel of water ready at the temperature you want, and put it in and stir it. By this means you get the water mixed uniformly through the curd.

Question.—Do you consider that the quality of cheese is injured through whey going back in the milk cans?

The PRESIDENT.—I have no hesitation in saying that it is. I do not say that fine cheese cannot be made and are not made in factories where they do it. We have very strong opinions on that subject, and I think were the first to call attention to it. I remember districts where the practice prevailed, and where they were getting a low price for their cheese. We could notice the effect of the sour whey. If there is anything more sensitive than milk I do not know it. In many cases the cans are imperfectly washed, and this of course must affect the cheese. I have had the management of factories for twenty-four years, and I would not take a factory as a gift where I had to send back the whey in the cans. It is because of this practice to a large extent that the reputation of our goods is injured, and our reputation is saved by those factories which do not practice it. I know factories whose reputation was not at all good, but, after this practice was discontinued their product became equal to that of any other. There is all the less reason for continuing this practice because the whey that is taken back is of very little value. And besides it increases the cost of hauling the milk to the factory. It is an injury to the cans. The carrying cans will not last a fraction of the time, and in a very short time they get almost unfit to use. The sour whey will eat off the tin, and then you have nothing but the porous iron, and it is almost impossible then to get the milk cans clean. It is a filthy practice at the best. Our old friend Harvey Farrington, regarding whom we cannot speak too highly, made a remark to me when I visited his factory twenty-five years ago. I never saw a more intelligent or unselfish man. He said that in cheese-making if you made a right start you could stay there, but if you began wrong it was exceedingly difficult to get right. This is the position of many of our factory managers. The practice has been introduced and it is difficult to change it, but where a change can be made it should by all means be made. The next best thing is to see that the vats are clean. There was a district where they were making cheese at one time and the cheese had a peculiar flavor for which I could find no reason. I happened to be in England in the spring when some of these cheese were brought over. They sold at 20 shillings per cwt. under fine. I could not understand what could affect their quality to such a serious extent. I last I came to the conclusion that it was nothing but the sour whey. One factory discontinued the practice and it has had an enviable reputation from that day to this. The agitation and discussions in favor of cleanliness have had a great effect. Everybody ought to try to discontinue this practice and to make a more profitable use of the whey. It is impossible for everyone to get justice in the distribution of the whey, to give everybody his exact proportion. Let us try to improve all we can. I do not care how long you have made or how well you can make; there is no one but can get good by visiting another factory. Mr. Bell was supposed to have the confidence of the cheese-makers, and the directors thought he was the best man to put in charge of the Dairy School. You can learn a great deal by visiting that school. We had to go further afield for our information in the early days, and when I began I went to the United States and visited their factories there. I never saw a cheese-maker made at these conventions. If a thing is to be learned it must be learned by practical demonstration, as every cheese-maker knows, to produce the best result.

Mr. PODMORE.—It will be interesting to hear from Mr. Price, one of the patrons of the Mount Elgin factory, as to the value of the skim milk he received from the creamery.

Mr. PRICE.—I think the skim milk is worth the feed we put into cows; besides, we have the butter to sell.

The Convention then adjourned until Thursday morning.

FOURTH DAY.

The Convention resumed at 9.30 o'clock.

The PRESIDENT.—We have yet one of the most important speakers, as you will admit after you have heard his address, Prof. James, who has been long connected with the Agricultural College, and did excellent work there, and who now occupies the position of Deputy Minister of Agriculture for Ontario.

HISTORY OF DAIRYING IN CANADA.

Mr. C. C. JAMES then spoke upon the above-named topic. A report of this address will be found in the proceedings of the Eastern Dairymen's Association.

The PRESIDENT.—I am sure those who have been able to remain must have enjoyed the interesting and practical address of Prof. James. To many of you the facts he has given will be new, and nothing could be more interesting to a convention of dairymen than the early history of dairying. The practical suggestions he has made were valuable, and I hope we will be able to take advantage of them and follow on the lines he has indicated.

Mr. T. J. DILLON, of Mount Elgin, then gave an interesting address reviewing some of the experiments carried on under his supervision in connection with the Dominion experimental dairy work, and discussed at some length the best methods of making first class cheese. It has been found impossible to present Mr. Dillon's paper, the copy of which has gone astray in some unaccountable manner.

The PRESIDENT.—Mr. Dillon referred to the statement that I made of what I found in England when I was there in September as to the prices paid for Scotch cheddars over our finest Canadian cheese of 14 shillings a cwt. That was solely on the basis of the quality due to extra richness. I said also that the quality was uniform and the results they had attained were altogether due to the work of our Canadian instructors. There was no dispute about that. I mentioned also that in the Royal Agricultural Dairy show they literally took all the prizes they competed for except one. The newspapers in England gave the fullest credit to the instructors for what had been done. All this came about through what you might call an accident. A gentleman, (Mr. Wallace) a stranger to me, visited Canada from Scotland. He called upon me, and among other places I took him to Bow Park. He was much interested in their cattle and sheep, and in dairy farming. I made him a present of a cheese which he took home, and it pleased him so much that he took steps to form a Dairymen's Association there in order to work upon our methods. The Dairymen's Associations are the only agricultural associations in Britain that get assistance from the Government. They get £5,000 a year. They asked to have some of our Canadian instructors sent over, and the result has been an immense change in the quality of their goods. I stated that their cheese was richer. There is something in the character of their milk that gives the greater richness to the cheese. There is no question that rich milk will make good cheese. I was told of some cheese that I shipped myself a year ago. They are still held and are as fine goods as any on account of the extra fat. I bought four of the Babcock instruments and sent them to England,

and they will be used in the dairy schools there. One great advantage of the instrument is that it enables us to select the animals that give the best milk. Professor James referred to a very important matter as bearing upon the prospect of our Canadian product when he spoke of the bad reputation our American neighbors have made. They thought that they could remove a portion of the butter-fat from the milk and still have cheese that would claim the market, but the effect is to diminish the consumption, and if Canadians were to attempt it they could not hold the place that they now hold. We were largely indebted to our American neighbors in the early days for information upon the subject of cheese-making. Professor Arnold came here and at one of our meetings attempted to show us that we could make more money by removing the butter-fat to be used for something else, putting in its place inferior fat, making what are known to-day as filled cheese. I remember that I for one rushed to the front of the platform and begged our friends never to attempt to adulterate their goods, to make a pure article, for then they would be sure to get the value for it. I am happy to say that that advice has been followed. Ours are the full cream cheese and are bought as such. Take the trade papers and you will find our cheese quoted four to five shillings better than the Americans. You will never get people to buy cheese if you take the butter-fat off. You will injure the reputation of the country as a dairying country to an incalculable extent. In England they will have the best, and they are willing to pay two pence a pound more to get an extra rich cheese.

Mr. T. Lloyd Jones.—Yesterday and to-day I have listened with a great deal of pleasure to the able speeches and papers at this Convention. I am not a dairyman myself, but a farmer ; I feel a great interest in the dairy industry. Professor James has referred to the Farmers' Institute and to the effect it would have if the institutes would allow the members of this Association to read papers before them. I agree with him, and, being a representative of the institute, I think I may say that there is not a local institute but would be willing and glad at all times to receive papers from some of the practical men of the Dairymen's Association. I hope your Association will be represented at Toronto at the central meeting in February next. I regret there has not been a larger turnout from the county than there was here yesterday, but I believe there was a fair representation of the farmers of this district. I feel that we are indebted to your Association for your kindness in coming to this county, and as an old county councillor I feel that I am only doing my duty in extending to you our acknowledgments.

Mr. P. H. Green.—I think, as a member of this Association and as a cheese manufacturer, that we have not as an Association brought the cheese industry before the people as much as we ought to have done. I think the plan of bringing the subject before the different Farmers' Institutes is one of the best that can be adopted. We meet the farmers once or twice at public meetings and have a general talk over dairy matters, and they return to their homes and probably think little more of the matter, but at the Farmers' Institutes we could get a good turnout, and the subjects could be more thoroughly discussed. I think it would be well if the Association were to appoint men to appear before these institutes and give papers and addresses. The last paper read has been a very useful one to me, and I have received hints from it that will be worth money. There were one or two points that will be of great use to me in my own factory. The gentleman made some reference to hand spreading. I can see that my cheese-maker handled these curds too roughly at first. I spoke to him about it several times. He has made fourteen or fifteen years and he thought he knew all about the business. But that was one point I insisted upon. I would like to ask the speaker if he would prefer spreading with the rake rather than with agitators. I thought sometimes they were running a little too rapidly, and I see he did not make any reference to stirring with agitators.

Mr. Dillon.—In my experience I have not used agitators except in factories a day here and there. I like the work they do very well, and believe they are a good thing. You speak of our handling the curd too roughly. By handling the curd wrong in the first ten minutes the cheese-maker put himself in for an hour or two at night. If he takes care he will save money for his patrons and save work for himself at the end of the day.

Mr. Bell.—The curd should be handled very gently at first. As to the agitators, I like them very much.

A Member.—In reference to curd mills, what mill would you recommend me to buy?

Mr. Dillon.—I do not know that it is proper for me to say which mill I would recommend. Probably some would think I was recommending a mill for the benefit of the manufacturers. But the Harris mill is my favorite.

A Member.—Is that an upright mill?

Mr. Dillon.—It is a little mill with a knife and a hopper that works something like a pump. It cuts the curd all the same size.

A Member.—Does it cut in any particular shape?

Mr. Dillon.—It cuts it into square pieces about half an inch square.

The President.—I quite agree with Mr. Dillon that where the curd is carefully and skillfully manipulated you get good results with the Harris mill. With an old experienced, careful maker like Mr. Dillon or Mr. Bell that is the case. You get that flintiness that is one of the finest points of the best cheese; but we would rather want the flintiness and have the cheese solid. But cheese with these ragged holes they regard in England with horror. Some of our best makers and some of our best factories use the Harris mill. In Scotland they have discontinued the use of the Harris mill and they are using a knife. Mr. Harris sent a lot of his mills over. I was responsible for Mr. Harris being there, he being the first instructor sent from Canada, and I think he does not take it very kindly that I speak as I do, for I have expressed this opinion before. The mill is all right in the hands of a careful and skilful man.

Mr. Beam.—As I wish to buy a mill I would like to have your opinion as to what you would prefer.

The President.—If you want a straight opinion I would say get one of the Whitelaw mills. Another difficulty we have had with the Harris mill is that it is harder to get the curd right with tainted milk. But with pure milk and an experienced maker I would prefer the Harris mill. Speaking generally, I would not advise a new maker to get one. We cannot always have first-class men to manage our factories; we must take men as we can get them.

Mr. Dillon.—If you are thinking of getting a curd mill I would say, see that your cheese-maker keeps it in a good state of repair. They are apt to get out of order, so that some slices are as thin as paper and others two inches thick. It is better to have them uniform.

A Voice.—How about the Whitelaw mill?

The President.—I would recommend that in preference to the other.

Mr. Beam.—In connection with what has been said regarding our speakers attending the Farmers' Institutes, I have here the programme of Institutes in Welland County and there is nothing in regard to instruction in dairy business. The farmers in that district have been paying attention to raising horses for the Buffalo market, but being cut out of that now, I think the cheese business one of the best they could undertake. I have come over a hundred miles to attend this meeting and the information I have received is exceedingly valuable. It is worth hundreds of dollars to any one running a cheese factory. The farmers are not instructed on this subject, and if this information could be disseminated among them, the benefit would be incalculable. I think it would be well to adopt the suggestion made and send out instructors and lecturers as the fruit men do.

The President.—I may mention that the new Board have had that matter under consideration and have a plan that they believe better even than the one that is suggested, The Farmers' Institutes are splendid things, but you cannot get every one interested in dairying to attend the institutes. But we can reach nearly every patron by working through our own factory system. At the annual meeting of a factory you may have

one hundred and fifty to one hundred and seventy patrons and not more than ten per cent. of them absent. There are a few of these meetings yet to come. I have agreed to go to Bluevale and speak to them there. At these meetings we can give them line upon line and precept upon precept, showing them what results can be obtained by taking good care of the milk. Had time permitted we would have made arrangements to go down to the meetings at Welland, for that is the district that needs help on this subject of dairying. The advantages of dairying are shown by the experience of the township of Elma. Thirty years ago that township was assessed at one-half the equalised value of the townships in the southern part of the county. They commenced dairying, establishing private dairies which developed into factories. I was their only instructor. There is no place where better cheese are made to-day on the continent of America, and there is no place where a farm sells so readily. Go into any ordinary farming district and you have difficulty in selling, but in that township you can sell an ordinary one hundred acre farm at from five to six thousand dollars at any time, because money can be made there in farming. If a man makes dairy farming a specialty there is no branch of farming so certainly remunerative. A man must go at it intelligently and make a specialty of it, and with that there is nothing he can undertake in which success is so well assured.

On motion of Mr. Geary the Convention adjourned.

III—CREAMERIES' ASSOCIATION OF ONTARIO.

OFFICERS FOR 1892.

President.....D. Derbyshire, Brockville.

1st Vice-President.....Aaron Wenger, Ayton.

2nd Vice-President.....John S. Pearce, London.

Secretary-Treasurer.....R. J. Graham, Belleville.

Directors:

Division No. 1.—John Croil, Aultsville.

Division No. 2.—A. C. Burgess, Carleton Place.

Division No. 3.—T. J. Miller, Spencerville.

Division No. 4.—John Sprague, Ameliasburg.

Division No. 5.—Robt. Philp, Cadmus.

Division No. 6.—M. Moyer, Toronto.

Division No. 7.—J. T. Brill, Guelph.

Division No. 8.—W. G. Walton, Hamilton.

Division No. 9.—John Hannah, Seaforth.

Division No. 10.—James Struthers, Owen Sound.

Division No. 11.—T. Brown, Holstein.

Division No. 12.—A. Wark, Wanstead.

Division No. 13.—J. N. Zinkann, Wellesley.

LIST OF MEMBERS

FOR 1892.

Name.	Post Office.
Ashley, John B.	Neustadt.
Abrams & McLennan	Camerontown.
Boyd, Alfred	Toronto.
Brown, Thomas	Holstein.
Brubacher, W. H.	St. Jacobs.
Betzner, Moses	Berlin.
Betzner, David	Berlin.
Brill, S. R.	Teeswater.
Brill, J. T	Guelph.
Binions, W. C.	Iroquois.
Banford & Johnson	Hainsville.
Balkwell, George	Walkerton.
Bissell, James	Brockville.
Bissell, W. J.	Algonquin.
Bush, C., M.P.P.	Kemptville.
Burgess, A. C.	Carleton Place.
Canadian Grocer	Toronto.
Carmichael, James	Arva.
Clark, H. T.	Brampton.
Clark, J. K.	Chesley.
Croil, J. H.	Aultsville.
Coleman, James	Egmondville.
Cheesman, James.	Southborough, Mass.,
Collett & Isaac	Cardiff, Wales, G.B.
Caloren, George	Iroquois.
Cobar, Orlando	Dixon's Corners.
Campbell, A.	Ormond.
Cluff, W. J.	Brockville.
Cooper, C. R.	Toronto.
Derbyshire, D.	Brockville.
Dean, Prof. H. H.	Guelph (O.A.C.)
Dominion Dairy Supply Co.	Quebec, Que.
Davies, James	Toronto.
Dargavel, A. M.	Durham.
Davis, Edward	Brockville.
Ecksten, Daniel N.	Neustadt.
Eureka Salt Co.	New York, N.Y.
Everts, M. K.	Easton's Corners.
Fuller, V. E.	Hamilton.
Farmers' Advocate	London.
Graham, R. J.	Belleville.
Hunber, Samuel	Rockton.
Henry, Frank	Whitechurch.
Hannah, John	Seaforth.
Halliman, A. C.	New Dundee.
Harkness, A. D.	Irena.
Hilborn, Isaac	Elmira.
Harcourt, George	Charlottetown, P.E.I.
Hume, James	Ayton.
Howie, H.	Newburg.
Halliday, W	Chesley.
Johnston, D. P.	Arva.
Johnson, C. & Son	Athens.
Kinsey, S. V.	Guelph.
Knapp, Charles D.	Neustadt.
Kuntz, E. G.	Formosa.
Knapp, W. H.	Colborne.
Law, George	Berlin.
Lackner, John L.	Chesley.
Laidlaw, Wm.	Ayton.
Live Stock Journal	Toronto.
Miller, E.	Parkhill.
Moyer, P. E. W.	Berlin.
Moyer, M.	Toronto.
Miller, T. J.	Spencerville.
Munroe, Charles.	Dixon's Corners.
Macfarlane, Thomas	Ottawa.
Macpherson, D. M.	Lancaster.
McLeod, J.	Lancaster.
McAuley, Daniel	Ventnor.
Oilschlager, Wm.	Berlin.
Philp, John	Dromore.
Philp, Robert.	Cadmus.
Pearce, J. S.	London.
Pilow, James	Camerontown.
Reiner, J. G.	Wellesley.
Randal, David	Ayton.
Ross, J. F.	Kirkton.
Rorke, H. J.	Owen Sound.
Ramsay, R. H. & Son	Toronto.
Rutherford, W. D.	Iroquois.
Robertson, J. W. (Dairy Commissioner)	Ottawa.
Sparling, John H	Neustadt.
Shantz, Aaron	Haysville.
Sprague, John	Ameliasburg.
Snyder, Joseph B.	Waterloo.
Snyder, M. B.	Waterloo.
Shantz, Daniel	Haysville.
Sprague, Mark	Ameliasburg.
Shantz, W. E.	Berlin.
Swan, Robert	Toronto.
Smith, Andrew M.	Camerontown.
Struthers, James	Owen Sound.
Tye, H. D.	Haysville.
Tousant, Charles	Iroquois.
Wand, Lawrence	Neustadt.
White, S. J.	Belleville.
Wark, Arch.	Wanstead.
Wenger, Aaron	Ayton.
Walden, Frank A.	Ayton.
Walton, W. G.	Hamilton.
Wilson, Frank	Montreal, Que.
Zinkann, J. N.	Wellesley.

SEVENTH ANNUAL CONVENTION

OF THE

CREAMERIES' ASSOCIATION OF ONTARIO.

Brockville, Jan. 18, 1892.

The seventh annual meeting of the Ontario Creameries' Association was opened at 2 o'clock this afternoon in the Court House here, with the following address by the President, Mr. D. Derbyshire.

PRESIDENT'S ADDRESS.

I am delighted to have the Creameries' Association meet at Brockville, because our people are anxious to learn, and no greater opportunity probably will ever be given than at present to get solid facts in connection with our business, having the best men of advanced dairy thought to address us. I am anxious that every member should feel at home, and take hold of the work of the Association and make this the best of all Conventions yet held in this province. We have done a good work the past year, issued instructions to every proprietor of a creamery; also instructions to every patron in the shape of a book, showing the kind of a cow to keep, and how to feed her, to get profitable returns. Our instructor, Mr. Sprague, has done good work, visiting every creamery twice and giving personal instructions to others who contemplated starting creameries. Our exhibit at the Industrial Exhibition was very satisfactory. In fact it was a revelation to thousands of our people who visited the dairy department. The butter was judged carefully by points, and a score card placed on each package, showing all points of merit, as well as the poor. Our Secretary has been untiring in his efforts to promote the creamery business, doing twice the work ever done before. I have delivered a number of addresses to different creameries, trying to stimulate them in the good work, and yet we have not made the progress we should. The farmers are not feeding or caring for their cows as they should to make money. Every dairyman should have a set of scales, to weigh each cow's milk, and a Babcock test to see how much butter-fat is in it, and then we would soon commence to work intelligently, and a cow that was found wanting would be sent to the "left" and travel in the broad road which leads down to death.

What can be done to get our friends who furnish milk to creameries to deliver a better quality and twice the quantity? Even this would not be large, but it would at once put our business on a paying basis. We must do something in the year we have just entered. Would holding public meetings at each creamery, and impressing each patron, as far as possible, that he must keep better cows, feed better, care for them better and put more energy into the business, have the desired result? If so, we must undertake this work. I think we must pay every man who furnishes milk to a creamery this year for the butter-fat contained in it, thereby encouraging honesty, and rewarding men who are trying to keep better cows and feeding and caring for them properly. There is nothing in the world like a Babcock milk tester for keeping men honest, and weeding out scrub cows which have been a bill of expense all the days of their lives.

Our manufacturers have in most cases good buildings, with perfect machinery to handle the milk; so I think our efforts must be turned to the man who makes the milk. For the last number of years we have been working night and day to raise the standard of our butter and cheese, and have succeeded well, but I am sure that we cannot make much further advancement until our dairymen get thoroughly aroused about producing better milk in larger quantities, and seeing that it gets to the creamery in a more perfect condition. Water cannot rise higher and be purer than the fountain, so we must have better raw material to work with and all our energies must be turned in this direction. We all know how small the returns have been on account of the low standard of our cows in this empire province—under three thousand pounds per cow. If every member would go home after this Convention and build a silo, if he has not one at present, and do missionary work among his neighbors till spring, we would be able to arouse this province to its very centre, and accomplish great results. I am terribly in earnest on this question, and trust you will now take hold of the work and see if we cannot do something. I appeal to you, creamerymen of Ontario, if there is not something wrong when we have from the plat form, the press, and in every way been working for the last ten years trying to get more milk per cow. Yet how very slow has been our progress!

I drew your attention last year to winter dairying, and I find Mr. Johnston, of Athens, has made twice the butter since the regular cheese factory season this year than ever before. I got over two hundred packages of fancy butter from him the other day, paying him 23 cents. You can easily see the great importance this is to that section. Mr. Bissell will put in a separator and butter plant and make creamery butter next year after the regular cheese season, in his Willow factory, and I am in hopes other fine dairy sections will follow suit. I know our manufacturers will not stop at the expense, providing they receive encouragement from their patrons.

Think for one moment the great loss our province is annually sustaining—$1,500,000, or five per cent. loss, on account of having improper facilities, besides 4 cents a pound by not being made in the best way, by the best people, with the best implements, or $2,700,000. Notwithstanding this, only three per cent. of our butter is made in the best way, and 97 per cent. by unskilled people without proper outfit or surroundings. You can easily see our condition, and I beg of this Association to go manfully to work to better the condition of our countrymen. Insist on having better cows, better stables, better and more nutritious food, in larger quantities, with better educated men to carry on the work, and success will crown our efforts. (Applause.)

COMMITTEES.

The President then named the following Committees:

Order of Business: Messrs. Graham, Moyer and Hannah.
Nomination: Messrs. Hannah, Graham, Wenger, Zinkann and W. G. Walton.
Dairy Utensils: Messrs. Sprague, Carmichael and Miller.
Resolutions: Prof. Robertson and Messrs. Wark and Hunter.
Finance: Messrs. Halliday, Brown and Philp.
Legislation: Prof. Robertson, and Messrs. Moyer and Derbyshire.

THE ADDRESS DEBATED.

Mr. John Hannah opened the discussion. He said: There are a few points of the Presidents' address which it struck me it would be to our advantage to discuss. The first I have noted is his reference to the exhibit of butter at the Toronto Industrial Exhibition last fall, under the direction of the Ontario Creameries' Association. It was a new departure at that exhibition to have the butter judged by a scale of points. I think it was an unqualified benefit to the creamery men to have their butter judged in that way. The

trouble with judging in the past was that our butter had a value set on it in the prize list and you were left in the dark as to why it was in that position. If you got first prize you did not know why. We all know there are different points to judge by. We have the flavor and the body as the two main points, and then we have minor points, such as the salting, and also the finish and the general appearance. Under the old system one was very anxious to know where he had failed, but without a scale of points there was nothing to tell him whether he was up in flavor and down in grain, or up in grain and down in flavor. This new method of judging has an educational influence on the butter makers and inspectors. That, I think, is a great advantage, and I hope it will be followed out in all exhibitions of butter, and if so it will go very far to improve the quality. The next point which I have taken note of is in regard to the feeding of cows. Of course we all know the milk product can be increased very much from what it is at the present time. The figures our President has given us—3,000 lb. of milk per cow in six months—is not a profitable amount to produce. You must have a cow that will give a larger return, and if she is not doing that she is not a profitable cow to the farmer. Until you can educate your cows to give a bigger return, dairying is not going to be a success in the end. We have in the past been preaching to the farmers in this Association the gospel of increasing the flow of milk, and I have no doubt there is a great deal of room for preaching it yet.

One idea too, in regard to the holding of public meetings at each creamery, I think is a very good idea. I have had some experience in that line, and the great difficulty is that those you want to be at the meetings, to get good, and who have the most need of education, are the most difficult to get out. I may say that for the last two or three years I have been able to get good patrons' meetings at my creameries once a year. The way I manage is to hold back the last payment for the year, until I arrange the meeting. I can get the patrons there and hold them there, and I put it on to them for an hour or an hour and a half before I pay a single one of them. (Laughter).

Another point—that in regard to paying for the butter-fat of the product—is one that has got to come to the front. The gathering creameries are in advance in that line. We are a law unto ourselves. I do not ask the magistrates to step in and make men honest, but every day we take a sample of each patron's cream and test it, and he is paid according to the butter-fat in his cream for that day. Until you do that you are going to have trouble with your patrons. It is a very disagreeable job for any person—whether the proprietor of a creamery or the inspector—to bring patrons before a magistrate to make them honest. It is a public exposure, and hurts all parties, although of course it has a good effect in one way, but if you can make them honest in this other way it is better all round. There is no injustice in it, and I have had no difficulty in getting the patrons to agree to it.

As to the silo question, which has been brought up by our President, it is a very important one no doubt, and I hope that will be fully discussed along with winter dairying. I hope the speakers will be able to give us facts and figures to show us the value of silage. Corn is a cheap food and can be grown over all this province with a considerable degree of success, and with very great success in the greater part of it. By means of the silo, corn will be a good thing for winter dairying. We have in the summer other work to do on the farm and should try to make this as light as possible. Now, we are causing loss to our country and ourselves by not carrying on dairying in the winter time. We turn men adrift in the fall, whereas it would be much better for the country, for the men and for ourselves if we could give them employment all the year round. In connection with winter dairying that is quite practicable, and I hope it will be done. The extra price of butter in the winter will allow for the extra margin on the food, and by that means the farmers could give their families a lively interest in this work, and there would not be so much trouble with boys leaving the farm. This scheme of turning cheese factories into creameries in the fall I do not see any trouble about at all. Where you have strong cheese factories for possibly four months, they can be converted into creameries, and perhaps at very little expense, at the close of the cheese factory season. I think the tendency would be to keep fewer cows milking in summer and divide them better over the winter for profit.

With reference to those figures we have in the last part of the address, I think we may say those all refer to dairy butter. There is no doubt in the greater proportion of our dairy butter the farmers are losing money which they try to make up in some other way, or if it sold at its full value it does not give anything to the producer in the way of profit. There is no doubt that by turning this product into creamery butter, there should be two or three cents profit per lb. to the country. Some farmers expect to get the full selling price of the article after it is made at the creamery, but I think they will scarcely get so much during the summer months for their butter as they get for their cream from the creameries, and in winter they will get from two to three cents better than the selling price of dairy butter. No, I think we have enough energy and intelligence to get over these leaks on the farm, which are almost making the country—at least the farming country—cry out in consequence of bankruptcy. If the farmers will only turn their cream into the creameries, I see how thousands—yes millions—of dollars can be saved to this country, and it will do very much to drive away the hard times which we are so apt to complain about. (Applause).

Mr. Moses Moyer.—As I am not exactly a creamery man now, I do not think I should take up much of your time to-day ; although, having been one years ago, it always brings up the old fire when I meet with old friends again to discuss this very important subject. I am still as strongly of the opinion as ever I was that if we make butter at all in this country, it ought to be made on the creamery system. I am handling all kinds of butter in the city, and the idea occurred to me yesterday, that if I were to bring a sample of all the butter I had in my place and lay it on the table for you to see, I could give you more varieties, I believe, than you ever saw before, and I think it would bring you all to the conclusion, that if the people at the present time are making such a variety of butter, it is not to be expected they will ever make a uniform butter such as you require in order to make this a butter country. It is a great mistake that there is so much butter made which is not what it ought to be. Some people have the idea that because there is so much bad butter made it gives a better chance to those who make good butter. That is a great mistake. The city of Toronto is packed full of this butter that nobody wants and that everybody has got to sell. It pulls down the price. Merchants all over the city have it to sell, and you will see cards stuck up "butter 14c., 16c. and 18c." People come along to your store and ask for good butter. Then they ask the price. It is 25c. "Oh," they say, "we saw it down street for 16c." I was very much amused at Mr. Hannah's idea of making the farmers honest. I have had a great deal of experience in that line. Unfortunately I was in the business when we had not the instruments to test the value of the cream that you have now, and I had to trust to the honesty of the farmers very much to carry on my creamery right, and it amused me very much when one of the speakers said the farmers were honest when they knew it paid to be honest. I think that is the way to make them honest. I do not think it is right to bring them before a magistrate. When we can show them they cannot get anything at all by trying to cheat the factory, that will make them honest and they will stay honest. So I think we have overcome the greatest difficulty through the system by which we can test everybody's cream. Under the old system the farmer looked upon the creamery as an institution that was trying to catch him doing wrong and to punish him for the act. Now he knows the cream will be tested, that the creamery man will not think he tried to cheat, and that he will be paid just for what he gives. So it does away with that miserable feeling of suspicion that existed during the time I was in the business. It was the only link, is seemed to me when I was in the business, that was missing, and I am glad to think it has been supplied, and that we have a bright future for the creamery business. I am glad that we have advanced. I believe we are further ahead to-day than we ever were before, and if we live a few years longer, we will see the butter industry come to just what we want it to be.

Mr. Aaron Wenger.—The big difficulty I find in my business is the improper feeding of the cows by the farmers and the improper handling of the cream and milk. The farmers do not get return enough apparently to make the business pay them, consequently they are not as prosperous and as satisfied as they should be. The average yield of butter

among my patrons this summer is possibly one hundred and twenty-five pounds per cow for the six months. That shows that some good is being done by our system of education as well as by our system of tests. By the tests they find it pays them well to give attention to the handling of the milk and the feeding of their cows. The trouble is that many farmers get their children to milk their cows. The consequence is that the cows are not milked clean, and drop down in their yield to perhaps half the quantity of milk and a much less proportion of cream. We are not getting the advantage of the market which we should. The Australian butter is now coming into the English market. It is now their summer and the butter is being brought over in refrigerator ships. I believe the time will come when we will have to get into the English market with the butter fresh. There is another thing that I want to impress upon the farmers—I know in my locality not one farmer out of ten takes a weekly or daily paper. I am in business, and I know it pays me to watch the markets; and in making butter and running a creamery I know it pays to make an article the consumer wants. In this age of progression the old system does not fill the bill. Farmers should, I think, take advantage of all their opportunities for receiving education, and to take a weekly or daily paper simply costs $1 to $3 or $4 a year; but for the sake of the dollar or two they will not take it. The dollar looks too large.

The PRESIDENT.—Quite a number of your people are Germans are they not?

Mr. WENGER.—Yes.

The PRESIDENT.—Governor Hoard says, that the fact of farmers not taking a daily paper gives an advantage to his creamery because the farmers do not learn all the deviltry that is going on. (Laughter).

Mr. WENGER.—That is on the underground telegraph principle. I remember Mr. Moyer running a creamery in my section. He introduced the deep setting can and found in some cases, that the cost of the cream required to make a pound of butter was sixty-five cents without the cost of gathering. (Laughter). They afterwards introduced the oil test.

Mr. BROWN.—In connection with the oil test, do you feel satisfied as to its justice?

Mr. WENGER.—I believe it is as accurate as anything we have or can have in connection with the cream-gathering system. I have had a number of my patrons test it. I requested them to test it. We issue a circular at the beginning of every year asking them to measure their cream and weigh their butter. Many of them came in and told me I paid them for more butter than they gave, according to their tests. Some, of course, complained.

Mr. BROWN.—In connection with our creamery I have only used it one year and we think we get very near the thing by the oil test.

Mr. WENGER.—I feel satisfied with it, we have used it three or four years.

Mr. MOYER.—How do you get your sample so as to get a fair test?

Mr. WENGER.—We have a pail twelve inches in diameter—on the principle that an inch in depth will make a pound of butter—we note the inches. We have a pointed dipper and, after stirring the cream up thoroughly, we pour a portion of it into a broad receptacle up to a certain depth, then put in the oil and cork the receptacle.

Mr. GRAHAM.—Would there not be a danger of getting the richer cream on the top into the dipper?

Mr. WENGER.—No, not by thoroughly stirring the cream first.

Mr. GRAHAM.—There was one difficulty which seemed to be a bug-bear among my patrons. I found in taking a sample of cream that there would be some of it stick to the glass and there seemed to be more cream left in the vessel than there should be. A quarter of an inch would make a considerable difference in such a test. We have got over the difficulty by using Fink's Oil Chart. It is immaterial whether we have three inches or five inches, we get just as close to its value.

A VOICE.—Then, according to your scale it would make no difference.

Mr. GRAHAM.—It makes no difference.

Same VOICE.—I may say that I was most suspicious of the oil test.

Mr. Graham.—Did you try the Babcock test?

Same VOICE.—No, I never could see the utility of it.

Mr. GRAHAM.—Don't you think it is practicable?

Same VOICE. Well, I don't know anything about it. I saw it in operation at the Guelph Model Farm, and could not see any benefit from it.

Mr. SPRAGUE.—In measuring cream you would have to get a special Babcock, which they are manufacturing now, to show up all the valuable constituents of the cream.

Mr. WALTON.—This is an old question I used to advocate years ago, and I have almost lost all interest in it in recent years. From 1876 to 1882 I was groping along in darkness, trying with some others to do something in this matter of creamery butter. In 1882 my friend Mr. Graham and myself went to Montreal and got some insight into centrifugal butter making. One topic I wish to speak of is that mentioned to you by the President, of turning cheese factories at the latter part of the season into creameries. It seems to me in the cream gathering system we have had more or less trouble, not particularly with the butter-fat of the cream, but with the care that should have been taken in getting the cream to the factory in good order. I have studied more in connection with this trouble probably than any other gentleman here, and I have thought of bringing up a resolution here either to day or to-morrow. It will be something in this form, although I shall not put it in the shape of a motion now. I think if we could get separators that could be put in the hands of every farmer at a fair price it would be well to have them uniform, and I was going to suggest placing before the government a memorial asking them to set apart $15,000 or $20,000 to manufacture one thousand of these separators and put them on the market so that there would be no expense in placing these with the farmers at cost. I think if we first talk over these machines and then choose a certain machine that we think the best, we might ask the government to make such a grant, and then ask for tenders for their manufacture. We have only one man in Ontario making separators, and I have thought we could get the price down so low, that in this way one could be purchased for $30 instead of $120. I have thought, that Mr. Sprague, at a little extra expense, might be engaged to inspect these machines, one hundred or two hundred at a time, and, that after a while they might be placed in the hands of every dairy farmer in the Province, and, that in this way we could raise the standard of butter in Ontario which is now below par in the foreign market. I should like to see this Association take steps to put this matter before Parliament at its coming session and see what we can do.

Mr. MACFARLANE.—I do not know that I am justified in saying anything just now, because you have put me down for an address to morrow, but there are some remarks that have called forth a few views of mine and I may just as well give them now. With regard to the separators and the gentleman who last spoke, I am told it is the case, that one plan has been adopted and is in use in Switzerland—that is to say, they use small separators at home; but the German is a very painstaking individual and a man accustomed to do a considerable amount of work. I doubt very much whether it would be possible to make the Canadian farmer or his belongings work steadily at these appliances from day to day. You must remember, that it is of the greatest importance, that this Association should do only one thing. You cannot try to introduce two or three different systems. If any improvement is to be made it is much better that only one thing should be tried, and it is of the very greatest importance that gentlemen should make up their minds and agree to recommend only one thing, either to the farmers, on the one hand, or, on the other hand, to the government whom it is proposed to ask for aid. It struck me, that Mr. Moyer touched upon the chief difficulty we have to contend with when he instanced the great number of varieties in butter. That seems to me to be the key to the whole business. To improve you must introduce some method which will give you a large quantity of uniform quality, because when you move this product into the market and wish to sell it you can sell it at a higher rate if it is of uniform quality

than if you have it divided up into half a dozen different quantities. I think, that in all your deliberations, unless you can come to agree to recommend some particular system you will not do much. There is no use trying to go off in different directions to try different experiments. Allow me to bring forward one or two things which I mentioned at your convention in Seaforth. In Denmark a farmer who has only one cow will not say that he can get as high a rate per pound for his butter as the man who has sixty or seventy cows. The position which the creameries have taken, is brought about by the amount of interest every farmer has in the welfare of the creamery to which his butter is taken. It means the adoption of the Danish partnership system, in which every deliverer of milk has an interest in the future success of the creamery corresponding to the number of cows which he keeps; that is one feature, I am told, which it would be very difficult to introduce into Canada. But, whatever you do you have got to recommend one thing. You must agree among yourselves before you ask either the government or the farmers to help you. The Danish system is to have the milk delivered to the factories and testing the milk, that is at the bottom of their system in every creamery. There is not a single exception where the cream is not paid for according to its value. I am afraid, however, you will not get the full benefit of that system if you expect the maker to do all the work in connection with the testing. I do not see how he can do all his work in making the butter and attending to his other duties in addition to testing the cream. Besides, it is not the proper thing to have the testing done by the man who has charge of the creamery. I think you will have difficulty in having the tests made at different factories and so I think the test should be made at some central factory, and that other factories surrounding should share in the expense. There is only another point and that is with regard to the reduction of the cost of silos and the feeding of silage. I only wish to remark that, in all my reading with regard to Danish dairying there is not one word about silo or silage. They have gone in an entirely different direction. They have fed up their cows with good healthy fodder, roots and grain. They have more stock than they can raise food for themselves and have imported huge quantities of wheat, bran and oil-cake, and it is from these products they produce the article that takes the first place in the London market. Possibly you might find that the butter from cows fed on a large proportion of ensilage in the winter is as good as that produced by those fed on grain. I only bring this forward. The old adage says "To be forewarned is to be forearmed." With a knowledge of what is the best feed you will be better able to fight for and meet them when the time comes.

Mr. Walton.—I wish to say a word here. Mr. Macfarlane, who has just spoken, misled you as to my intention. I quite agree with him that we should be quite unanimous when we go to the government. But, it is impossible, it seems to me, to have one system of testing in Ontario. Two systems might be recommended. Under one system the cream might be separated after going to the factory, and in another before it goes to the factory.

Mr. Sprague.—There have been a few remarks that I do not like to see pass without further investigation. Mr. Wenger, in his address, spoke of his patrons getting one hundred and twenty-five pounds of butter per cow. Now, the idea is just here: that could be made much larger. The loss occurs in this way, that the farmers by setting the milk, usually do not obtain all the cream, especially as the season advances. I tested milk in September in which one-third to one per cent. of the fat was left in the milk. That means, that in one hundred pounds of butter milk there were seven cents worth of butter. That would mean $2.10 per cow through the season, which would mean a great loss upon a herd of fifteen or thirty or sixty cows. An endeavor has been made to raise the constituency of butter, and to do this, we must pursue some particular course. I am fully convinced, that the centrifugal system is the proper system. It brings the manufacture of the butter wholly within the care of a competent man, who is able to make a uniform quality. I think the idea put forward by Mr. Walton is to get farmers to use a tester where they are not doing so. In regard to testing milk by the butter-maker or cheese-maker I do not see any objection. Every cheese-maker probably has sufficient time to do this, if he has proper help in times of necessity. He has moments or hours to spare. The

butter-maker has also two or three hours in an ordinary factory, that he should devote advantageously to himself and to the patrons, to testing the cream. The sample should be taken in the morning and set away until he gets ready to make the test, but not until the acid has developed so much as to have begun to destroy the butter-fat. A sample taken in this way is a correct one, and the test made will give a correct rating of the milk from which it was taken.

The PRESIDENT.—Do you not think we could have a school where we could educate farmers in the use of those testers?

A VOICE.—You could do that at Guelph.

Mr. BROWN.—In connection with the butter-maker testing the milk, do I understand that he would be expected to do this when he had spare time in order to ascertain its value?

A VOICE.—Yes.

Mr. BROWN.—Then the milk would be collected and brought to the factory and the cream extracted there?

A VOICE.—Yes, of course if the separator system should ever be adopted the milk would be tested in the same way as is done now where there are cream testers.

Mr. SPRAGUE.—We have at present doing business in Ontario twelve creameries gathering milk and twenty-three gathering cream.

The PRESIDENT.—What I understand Mr. Walton to say is that where the patrons are not at too great a distance from the factory and where there are large quantities of milk the proper way is to bring it to the factory and separate it there, but in small dairies where the patrons are far apart it is necessary to have it tested at home.

Mr. WENGER.—I gather from patrons twelve to fourteen miles apart, and it would be impossible to draw the milk and separate it at the factory, and the expense would be too great to introduce the centrifugal separator into the creamery.

Mr. GRAHAM.—Do you not think it would be a very good thing to have hand separators.

Mr. WENGER.—It would take a smarter man than I am to convince me of that.

Mr. HUNTER.—I am rather inclined to take exception to Mr. Walton's method of hand separating, and to take sides with Mr. Macfarlane. My reason is that while any new fangled thing might be taken hold of by farmers it requires a little skill to take hold of this; and while one man might have a steady hand and ability to do the work—for after all the centrifugal machine if not kept in order, can do bad work as well as good—the result would not amount to much. I understand a steady hand is necessary, and to turn a crank for, say, an hour at a time with a steady hand is not an easy thing and most of our farmers are not adapted to that sort of work. I have an idea in connection with carrying the whole milk to the factory. I have great faith in the work of the centrifuge, but the majority of the farmers put a good deal of value on the skim milk of the farm, and the difficulty of drawing the milk ten or twelve miles to a factory and after the cream being separated drawing back the skim milk seems to me to be insurmountable. My own idea would be to have a separator in connection with some central and well equipped factory which might be used for the work of half a dozen factories, the building for it being got up at very little cost with nothing more than sufficient shelter for the machinery and one competent man to take charge. Have these outside stations conveniently located, always keeping in view the fact that there was sufficient milk around to justify the proprietors in putting in a machine. A great many farmers would be convenient enough to such stations to carry their own milk there and carry their skim milk back.

Mr. GRAHAM.—In regard to this testing of milk, I got a Babcock tester, for use in my factory last spring, just for my own satisfaction, to find out the difference in the value of my patron's milk. I tested their milk twice and three times a week the whole season. I paid them for the milk by the quantity, but I wanted to find out which patron paid

me and which lost me money. I found there was a difference of $2 to $8 on eight thousand pounds of milk in sixteen of them as compared with the milk of sixteen to eighteen others. By this means I found out that some men were robbing their neighbors. This method is not an honest system, and that of testing the milk I think, can be practically carried out and each man be paid for what he is giving. But there is another matter that has been brought up, and that is in regard to this skim milk. Our good friend who just sat down said there would be a difficulty in getting the milk back from a large factory under the cream gathering plan. It was demonstrated that in Wisconsin there were several large cheese factories which were returning their whey sweet to their patrons, which, by their system, it was claimed, could be kept sweet for forty-eight hours. Their system was simply this, that after running the milk through the separator it was pumped by a steam syphon and heated to 180 degrees, which they claimed so sterilized the milk and whey that it remained sweet for forty-eight hours. They have tried this system in their state and the neighboring state in sixty or seventy factories. In this way one of the great draw-backs to the centrifugal system would be overcome. In regard to what Mr. Walton said I am right in favor of it. Of course if we could get the milk drawn to a large factory I would prefer the centrifugal system, but in sections where they make the fattening of cattle a specialty I cannot see that there is any possibility of ever getting that system introduced. However, if each farmer had a hand separator it would take no longer to test samples than it does to wash cans and set the milk. I have a tester in use this year in Belleville and it has been run there every day by different hands, and it did not require any experience to run it. Sometimes one hand ran it and sometimes another, just according to whoever happened to be in the factory at the time. So I think there would be no difficulty about the practical working of the system, and that there would be a great saving, because more butter-fat would be taken from the milk. I am satisfied that a greater percentage can be taken from it by this method than by the ordinary system.

Mr. HUNTER.—You are speaking merely about your factory, but what if there were only one man about home and the women and children had this work to do?

Mr. GRAHAM.—I do not know but a woman would find it easier to do than to strain the milk and carry out water to wash the pails and cans and do all the work in connection with the milk. The average of my patrons for last season was one hundred and twenty-five pounds of butter per cow. I have one patron(Mr. Jones) who has five cows and sent to my factory between the sixteenth of April and the 16th of November 32,400 pounds of milk, which you will see is a little over 6,000 pounds per cow, and he sent 243 pounds of butter-fat for each cow. What one man has done others can do. In regard to the butter made from ensilage I may say I have had some experience in connection with that and am making some butter from the milk, I have had no complaints about the butter made from that milk, and I fancy that if the ensilage is properly cured the very best of butter can be made from it.

Mr. WENGER.—I am going to advocate the gravitation system for the sake of argument. Where the gravitation method is in use we have cans 8 to 8½ inches in diameter which, when filled with sweet milk are set into a tank in cold water. Where the patrons have a good cold stream of water running around this milk the cream rises rapidly. Others, who have not the advantage of running streams of cold water, sometimes put ice around the can. Mr. Graham in advocating the use of the separator, stated that his best patron got 243 pounds of butter per cow for seven months. I got 200 pounds of butter in six months by the gravitation process. Now we will add $\frac{1}{6}$ to that to make the seventh month, that will be 233 pounds per cow under the gravitation system; so that I believe the gravitation system when properly handled is as advantageous as the centrifugal method.

Mr. MOYER.—There are some parts of our country where one system is practicable, and can be worked with advantage, and in other parts you could not possibly run that system. Mr. Wenger alluded to the difficulty in getting farmers to milk properly. Now, let us take up this one thing and settle it. Can we remedy it? The greatest trouble that the creamery people have is to reach the farmers. Is there not some way by which the

inspector could reach the farmers and educate them? If they find out it pays to milk their cows properly they will do it that way. They want a good deal of educating in these little details. I am very glad to think that this Creamery Association has done more good than we are conscious of. It has done the cheese factories an immense amount of good. It is only since these creameries were started that they could find out how much cream their milk made. They also found out that there was a difference in the value of milk, which has brought about this system of testing the quality of cream, and it will induce farmers to look after their cattle.

Mr. Row.—This thing interests me, and of course I have got to talk on it. The winter dairying is what I think will pay. Last fall I put in a silo. My corn had been planted three feet apart one way, and broadcast in the drill. I feed with it brewery grains. My milk has tested 4¾ per cent. fat. The only thing that has kept me from sending milk to the factories was that I considered my milk was worth more than my neighbors', because they did not feed as I fed. My silo is 10x15 feet, and 14 feet deep. In filling the silo I paid my whole attention to packing it around the sides, and especially the corners. I never lost one ounce of corn, excepting a little on the top—probably about four inches down. I covered the silage with some corn I had grown broadcast. I have been feeding as many as thirty to thirty-six cows out of it, but I have fed twenty-four cows since the 17th October, and I think I have enough left to last until the 1st, and probably until the 10th of February. The cows got nothing else from the 17th October until about four days ago, with the exception of about two feeds of straw and two feeds of hay. I was fattening a few cattle on grain, and the cows I fed on the ensilage are actually fatter than the ones I was feeding for beef. The milk seems to be all right. I have heard no complaints.

Mr. Hunter.—Would you say how many pounds of ensilage per cow you feed?

Mr. Row.—I think it would probably average forty-five to fifty pounds per day to each cow. I am so well satisfied with the ensilage that I have commenced already building another silo, so as to have one from which to feed in winter and another in summer. I find we have only six weeks summer out of the fifty-two.

Mr. Graham.—Do you not feed any grain ration?

Mr. Row.—I feed brewery grains.

Mr. Graham.—What do they cost?

Mr. Row.—Seven cents a bushel.

A Voice.—How long do you milk your cows?

Mr. Row.—Of the six cows we have but two that go dry.

The same Voice.—Do you find you get as much milk as under the system of milking a shorter period?

Mr. Row.—I get more; and I find I get more milk by feeding twice a day than I used to get by feeding three times. The great question with me has been whether the teeth of the cows will hold out or not against the effects of this ensilage.

Mr. Hunter.—I think the teeth will last as long as the cows need them.

Mr. Row.—I will keep the silo going whether I keep the cow or not. If necessary, I will sell the cow at the end of twelve months.

A Voice.—You rather surprise me when you say you have had only brewery grains with the fodder.

Mr. Row.—I have never fed anything but brewery grains, if the brewery was running. When it did not run I fed bran and shorts. I mixed them and gave the cattle the same proportion in dollars and cents' worth as I had been feeding of brewery grains.

Mr. Hunter.—Did you find the same results as when you fed the grain rations?

Mr. Row.—The brewery grains, I think, gave us the most milk, but I do not know.

Mr. Hunter.—At what stage of maturity did you cut your corn?

Mr. Row.—The corn I had was sowed in the drill. It was not planted in hills There were just what we call nubbins on it when cut. I tested my milk against a neighbor's, and I think his went 3¾ per cent. of fat against my 4 per cent. He was feeding corn which had been planted in hills and had long ears. I calculated his corn was richer than mine.

Mr. Hunter.—Then was your breed the same as his?

Mr. Row.—No. His were common cows and mine were grade Jerseys. I question whether if a stalk of corn had two ears there was the same strength left in the stalk. I calculated the richer food left in the stalk that had not the ears ought to compensate for the food in the ears.

Mr. Wenger.—Which had the advantage in quantity of milk?

Mr. Row.—I had not time to go into details at the time I saw him, and did not see him again. One great point, I think, is to get the farmers to take their milk to the creamery or factory and receive pay only according to its value.

The President.—If you want to make money in growing corn for ensilage you have got to plant it further apart. You want to put the seeds ten inches apart, because you want the sun to get in about the roots.

Mr. Hunter.—How much seed to the acre did you plant?

Mr. Row.—About a bushel.

A Voice.—Where I had four quarts to the acre as compared with a larger quantity, I had a great deal better corn.

Mr. Row.—I do not intend to put in any more in that way.

Mr. Sprague.—I would infer from the remarks of the last speaker that no conclusion has been arrived at yet as to the proper stage of maturity at which to cut the corn. Mr. Row's corn had nubbins and his neighbor's had ears when it was cut. Can you take forty pounds of one cow's milk which will give two pounds of butter when she is fed on corn, and feed her on anything which will make her give more butter?

The President.—Ensilage feed alone is not proper food. Fifty pound a day of ensilage may be the best fodder in the world, but you want to feed along with it a hay and grain ration.

Mr. Sprague.—Mr. Row was advancing the idea that his neighbor's food being richer than his own, he would expect his neighbor's milk to be richer; but I think his neighbor's cows are to blame for the deficiency. My argument is that feeding does not influence the quantity of butter-fat.

Mr. Hunter.—No; not without increasing the milk.

A Voice.—I am aware that the morning's milk is richer than the night's milk.

Mr. Sprague.—The shorter the period between the milking of the cows the richer the milk will be.

Mr. McNish.—I cannot agree with this gentleman on that point. The milk would not be so rich from the cow that is running outdoors as from the cow that is resting in the stable over night.

Mr. Row.—I would not give a snap for all the pasture between this and North Augusta.

The President.—Good! That is twenty-eight miles!

Mr. Row.—I say there is no way you can keep a cow so cheaply as in the barn. She will spoil in a month four times as much pasture as she eats.

Mr. Hunter.—I take exception to the statement Mr. Row makes about the pasture, unless he speaks of this particular season of the year. I have been led to believe always the best milk was got when the pasture was succulent in the early summer, and, personally, I would feed on pasture well into the fall and save all the labor I could.

Mr. Row.—What I mean to say is, if you will plant out your pasture—sow rye and feed the cows in the stable through the summer on this rye, following this feed up with clover and grain—you will not only get as much milk as you would from pasture, but will have the manure besides.

Mr. Hunter.—I would ask Mr. Row if he did not find a very bad taint from milk of cows fed with rye?

Mr. Row.—No, I did not.

Mr. Miller.—I agree with Mr. Row that it pays better to feed the cows in the stable, and the milk can probably be handled better when this is done than in any other way.

Mr. Hunter.—Would you make no exceptions?

Mr. Miller.—Of course; if you have enough land you will probably do better to pasture. Some farmers have such land that they can till every foot of it, and in their case it will pay better to feed in the barn.

A Voice.—Do you water in the stable?

Mr. Miller.—Yes, in the winter. We feed right along, so that the cattle have something before them all the time.

Mr. Hunter.—How many varieties would you include in your feeding?

Mr. Miller.—A certain quantity of ensilage, and we follow that with hay and bran and pea meal.

Mr. Hunter.—I believe twice a day is often enough for a full meal, but I believe in the middle of the day the cattle should have a "lunch"—call it a "lunch" if you like.

Mr. Carmichael.—I had no difficulty with my patrons about using the Babcock test.

A Voice.—Do you test every day?

Mr. Carmichael.—No; two or three times a week. We mix the milk well and take a sample out of the body of it every day. We got the same result from the milk when sour as when sweet.

The President.—Do you not think if you had a small hole in the can, which would let just a drop out at a time until you had a quantity, that by taking a sample of that you would have a fair test of the whole of the milk?

Mr. Carmichael.—We have tried several ways and do not find much difference.

The President.—What is the variation of butter-fat in the milk of your patrons, according to your tests for the past season?

Mr. Carmichael.—It has run from 2.80 per cent. to 3.70 per cent. nearly all the way through. In December the average of one patron for the month was 3.67, and the average of another 2.05.

Mr. Hunter.—In the latter case do you blame the cow or the man?

Mr. Carmichael.—I really think the man sent the milk as it stood. Two or three patrons sent a low average all summer.

Mr. Row.—Have they high or low land?

Mr. Carmichael.—Those on the low land had the lowest percentage, and those who fed their cows had the richest milk.

A Voice.—Did it take any more milk to make a pound of butter on the average under your testing system than when you paid for it under the pooling system?

Mr. Carmichael.—No; I cannot say I noticed very much difference, but the patrons that drew their own milk did better than the ones who got their neighbours to take it to the factory. They knew better what was going on.

Mr. Macfarlane.—Apprehension has been expressed that you cannot get the same results from the cream when it is sour as when fresh. We found in Ottawa that there is

no depreciation in the butter-fat from sour cream, but after souring has taken place—even after the cream has collected on the surface of the milk—you will understand it is very difficult to get two samples that will test the same.

Mr. Bissell, being asked to give his experience with the silo, said: I went into the silo business about four years ago and I find it a success. Our cows are doing splendidly on silage. I feed other things besides. I feed 30 lb. of ensilage and hay and straw. I feed it twice a day—at 5 o'clock in the morning the first thing is ensilage. Then by the time they have got that done we are through milking. We then feed straw or hay and then meal, and after that we water them. We then salt the cows. We never let them out of the stable from the time we put them in, in the fall, until the spring.

Mr. Hunter.—My own experience is that it is sufficient to salt them twice a week in the winter.

Mr. G. Graham.—I think if you have the salt in the bin they will take just what they need.

Mr. Wenger.—What kind of corn do you think suits best for silage? We find in our country the Giant Prolific and Dennis do not mature.

Mr. Bissell.—We use the large Mammoth Sweet, and by putting it in thin, so that the sun gets in around it, it grows well and gets to be about the maturity of roasting corn before being cut.

Mr. Graham.—How many feet high would it grow.

Mr. Bissell.—About 15 feet.

A Voice.—Have you any difficulty with the cows feeding from keeping them in as you say?

Mr. Bissell.—No. We have been doing it for four years. We milk some of them 11 months and some of them 12. We cannot dry some of them. The thing is to handle them right.

Mr. R. J. Graham.—I would like to ask Mr. Bissell how he handles this fifteen foot corn? How do you draw it out?

Mr. Bissell.—On waggons.

Mr. R. J. Graham.—What kind of a cutter do you use?

Mr. Bissell.—Our cutter is a good deal the same as the Ross.

Mr. Graham.—How fast can you cut?

Mr. Bissell.—We have four teams drawing it say 80 rods to the barn and we keep them going with 8 or 10 hands.

Mr. Graham.—Have you had any trouble with your lifter?

Mr. Bissell.—We used to, now we do not. We run it with a rope, instead of a chain, direct from the engine. We made a pulley on purpose which works at the top. Some of our corn turns out 25 tons to the acre. Where the corn was thin it was altogether better than where planted thicker.

Mr. Graham.—That has not been my experience. How long did you cut it for the silo.

Mr. Bissell.—We cut the large corn about 13½ feet. In milking, the farmers make a great mistake in not being regular. The cows ought to be milked at the same time every day, by the same milker, and milked clean.

The President.—Milk all the heifers 12 months, to teach them that is what they have got to do for a living.

Mr. Bissell.—One of our cows we have tried to milk over 9 months but could never do so, but her calves will milk 12 months.

A Voice.—How much will those cows give?

Mr. Bissell.—Some 6,000 to 7,000 of milk a year.

THE SAME VOICE.—What breed are they?

Mr. BISSELL.—Holstein.

Mr. GRAHAM.—You pool your milk.

Mr. BISSELL.—Yes, it is tested all the same. We are trying now to have the cows come in in the fall.

The PRESIDENT.—Send over to some of your neighbors who have cows that are not being milked regularly and are roaming about in the snow all winter and have nothing to eat; I wonder how long they would give this quantity of milk?

Mr. BISSELL.—Oh, they would not give it, of course. We have had splendid success with Holsteins, but it makes a great difference with cows whether they are fed and handled properly.

Mr. EAGER.—Do you think it affects the land to grow corn on it year after year?

Mr. BISSELL.—I do not think it does much more than any other crop. It cultivates the land and takes a great deal of moisture from the atmosphere.

A VOICE.—I would like to ask Mr. Bissell if he thinks it would be possible to raise corn for 20 years from the same land if properly fertilised?

Mr. BISSELL.—Yes, I think it would if you put back upon the land in the shape of manure what you take from it.

The PRESIDENT.—Don't you think it would be more advantageous to the farm to change around?

Mr. BISSELL.—Yes.

Mr. R. J. GRAHAM.—In reference to what Mr. Sprague said about feeding not improving the quality of milk, he was at my factory last spring and we tried to find out the reason why there was so much difference in the milk, and invariably we found that those who were supplying the poor milk were feeding their cows on straw, while those who were feeding clover hay and meal were sending 4 per cent. milk.

Mr. HUNTER.—That is not a fair comparison. You could take one cow that has run down to beef and by feeding her up you will give her a greater capacity in that direction.

The PRESIDENT.—You think that she puts it on her bones?

Mr. HUNTER.—I mean that if you feed a cow up to her very best capacity you cannot in a period of a week or a month or a year increase the quantity of butter-fat without increasing the quantity of her milk.

Mr. SPRAGUE.—I think feeding is the essential point, but I do not think there is as much strength got from feeding as from breeding. I think the butter-fat is a characteristic of the cow. I have tested this for the past year freely. I can take any cow I have and take the food away from her, or give her more food, and it will not make any difference in the quantity of butter-fat either way, per hundred pounds of milk.

Mr. R. J. GRAHAM.—I am quite well satisfied that a well bred cow will give richer milk than a poorly bred one.

Mr. SPRAGUE.—There is a good deal in feeding, but take a poor cow and feed her "gold-dust" and she will never repay you for it.

Mr. BISSELL.—I believe there is a difference in cows that way.

Mr. SPRAGUE.—I had a fair illustration last winter. I had two cows in one stall, eating out of the same box, and of those two cows one gave 3 per cent. milk while the other gave 4.1 per cent. milk.

Mr. ROW.—When I spoke of the pasturing question I might have said that at one time I had a farm on which I had no place for a night pasture; but there was an old meadow—ten years old—and I took an acre of it for a night pasture. I had 25 cows. I had a Scotchman working for me, and he said "This will be the best piece of meadow you will

have next year." There was no grass in it at the time. On that acre I took off 4 tons of hay the next year. I say if you have 30 head of cattle and have a silo for the same, and will turn the cattle out on 10 acres of land at night and let them lie there you have at the end of the summer got 10 acres fertilised and the next spring should plow that up and use another 10 acres as a night pasture.

Mr. WENGER.—I am glad to see that the conversation has drifted back to educating the farmer. The difficulty is that farmers are not educated with reference to keeping their cows and handling them properly. Mr. Moyer said a moment ago that the necessity was to have education among the patrons of creameries and I would like to know how he would secure this.

Mr. MOYER.—I did not say I was prepared to answer that question, and I thought when I spoke about it there must be some gentleman here who could suggest some idea on the subject. However, for the sake of argument, I may say I do not know how to reach them, but it just struck me that if the teacher in each school section were to tell the children that there is a great loss by the same person not milking the cows and by not milking at the same time each day, and not milking clean, that the children would go home and tell their parents, and that something might be gained in this way.

Mr. WENGER.—My suggestion would be that the inspector should advise the factory owner of his proposed visit a week or so before he comes to the factory, and let arrangements be made for him to hold a meeting and address the farmers. The Dominion Government might also send Prof. Robertson to some of these meetings.

Mr. MOYER.—The great difficulty is that in calling these meetings you cannot get at the very ones you want to reach. The most intelligent farmers are always interested enough to come out, but those who think they know everything you cannot get to come out to anything. For that reason the children by means of some instruction in the schools might be made a medium for reaching the parents.

Mr. MACFARLANE.—I think Mr. Moyer has started quite a good idea. It certainly is the case that in the country schools the boys must be more or less interested in agriculture, and if we were to teach them something in connection with the way they ought to earn their living I think it would do a great deal of good. I think the best way to bring this about would be for the Association to try and influence the Minister of Education favorably and see whether their ideas cannot be imparted to the young people as they are growing up. Such an education would tend to keep them in the country. If you want to educate the older people you must work through their self-interest; you must work through their pockets; you must show them by actual proof that what you want them to do is what is going to pay them better than what they are doing now.

Mr. HANNAH.—Some time ago an agricultural text book was authorised for use in the public schools, and I would be very much pleased to hear that it has been introduced into even 5 per cent. of the rural schools at the present time. The whole trend of our education at present is not in the line of agriculture. The only motive our common schools has is to fit our children for the high schools; and you know the result. I do not suppose 5 per cent. of those who receive a high school education drift back to the farm. If we could get school trusteees to take interest enough in the education of our children in the matter of agriculture to take up this course and see that school boards put it on their list of studies, I have no doubt that there would be a great improvement among the parents. My conclusion is that if the study of this subject were conducted in the school the parents would learn a good deal more than they ever knew before.

Mr. BROWN.—Agriculture is now a part of the education of rural schools, and I think our Association might emphasise the importance of the subject by passing a resolution with regard to taking steps to educate the parents through the children in the way that has been suggested. I do not think we can do that in the immediate future, but we can work to that end. I think it would be a good thing, as was suggested before, to hold public meetings, which would be addressed by our inspector, at the chief creameries throughout the country, and to make these more interesting it might be announced that the patrons would be paid at the close of such meetings.

Dr. Giles, of Brockville, said: With reference to the question of the advantages of studying agriculture, I think the mistake has been in introducing the subject into the common schools and confining it to them. I think the Government should have confined it almost entirely to the high schools. What is the tendency as soon as a scholar has passed into the high school? It is to study and learn a profession. That is where a great number of our young men lose all taste for agriculture, because they get a smattering of French and Latin and other subjects which fit them for other callings. I think there should be a lecturer to give lessons during every quarter in the high schools upon agriculture, because I want to say our farmers require to be educated for their business just as well as anyone else, and that every farmer should be, if possible, graduated from an agricultural class and the knowledge they derive from instruction in that class will give them a higher knowledge of agriculture. It is a great mistake to think that the farming community are not going to get out of the common schools. Now, the point is to strike in with this study of the high school. There is where the young men get the idea of their future life. Our educationists have left out of their plan of education the subject of agriculture, and boys lose the relish for farm life in the high school.

Mr. Macfarlane.—I have no doubt that agriculture should form a very high part of the curriculum of the high schools, and therefore it is important that the education should begin earlier—a great deal earlier—to get the children at the proper time, when they can drink in all this information. In regard to these higher schools, it seems to me they are doing more damage than good.

The Convention adjourned at 5 p.m.

SECOND DAY.

The Convention resumed at 9.30 a.m., the President in the chair.

WORDS OF WELCOME.

His Worship Mayor Booth was first introduced and cordially welcomed the Association to Brockville.

Mr. Robert Bowie, President of the Board of Trade, said: I can only endorse what has dropped from the lips of our worthy Mayor. Brockville, from my earliest days, has been deeply interested in the object of this meeting. Dating back to the time when we used to give a farmer a pound of sugar for a pound of butter, up to the present time, I can see the results of the efforts of just such meetings as you are holding here to-day, and while I am talking to some gentlemen here who are younger than myself, I would say, that the results have been such that I am satisfied beyond a doubt there is every encouragement to continue to agitate in order to produce a better grade of butter in the future. Such agitations have brought the result about that our butter now stands at a very high grade, and it affords me great pleasure to welcome you here to-day, knowing the busines you are engaged in and what your object is. I hope you will go on in your efforts, and that you will improve in the future as you have in the past. (Applause.)

Councillor McDougal said: I can only endorse the sentiments that have been expressed in holding out a welcome hand to you in coming to our town. I may say that while deeply interested in dairying, I am interested particularly in butter-making, and would like to see an improvement in that respect in this section. Discussions in the past have been of great advantage to this country, and I think discussions on the capabilities of butter-making in Canada are of very great importance. I am sorry, though, that so few farmers improve the opportunities offered to them. They do not even take the trouble to attend meetings where it costs nothing to hear discussions by practical men, and they thus lose advantages they would otherwise receive. I farmed myself until twenty-eight years old, and really knew nothing about the care of milk and production of butter, and I have learned more from these discussions than I ever did while farming. To-day I

would go at it as I do in business—intellectually—and the lack of intelligence is the bane of this country. Too many farmers, young men especially, when they get to be twenty years of age, think that people engaged in other lines of business, are having a better time than they are and want to leave the farm. For my part, if I were back at farming I would not leave the farm. No man wants to study his business more closely than the farmer. It is a very sad thing that farmers cannot be reached by such meetings as these. It is discouraging to see so few farmers here. I would like to see some plan adopted whereby they could be reached. There is one thing I notice you are advocating—winter dairying. That is something the farmers of this country have got to do or they cannot compete with farmers in other parts of the world. The idea of milking five, or six, or seven, or even ten months, is not as it should be. Winter dairying always pays the best. Winter butter to-day is selling at 23 or 24 cents a pound. With silos the farmer can surely make more money from butter in winter, because he not only gets the additional yield of milk during the winter but has revenue from the manure which he puts back on the farm.

The President, on behalf of the Ontario Creameries' Asssociation, most heartily thanked the gentlemen who had spoken their words of welcome.

MILK TESTING—DAIRYING IN DENMARK—NITROGEN AS A FERTILISER.

Mr. Thomas Macfarlane, Dominion Analyst, Ottawa, was next introduced. He said : It is always with a considerable amount of hesitation that I address such an audience as the present, because I am perfectly well aware that it consists largely of practical dairymen who are able and sometimes very willing to expose the fallacies of such people as myself, whose business is not closely connected with farming or butter-making. It is of course with a certain amount of suspicion that the dicta of such persons as I are accepted. I cannot pretend to be a farmer any more than a professor, and I don't suppose that I can even call myself an agriculturist. I do not know whether you are aware of the distinction that has been drawn between the two terms, but I may mention the distinction which has been given, as a sort of joke, by Mr. Jeremiah Rusk, the Secretary of the Department of Agriculture at Washington. I may put it in the form of a conundrum, and ask what is the difference between an agriculturist and a farmer? Rusk has answered it in this way, that a farmer is a man whose farm supports him, and an agriculturist is a man who supports his farm. This is, of course, a hit at the gentleman farmer who so often loses money on his farm. Now, I cannot pretend to be even an agriculturist, but I would like to put in a word in defence of agricultural theorists. Of course people are suspicious of men who advance mere theory, but, in my comprehension of the term "theory," an explanation can only be so called when it is supported by facts. The facts of a theory are to it what the piers of a bridge are to the whole structure. A theory is an explanation merely produced from and based upon facts already ascertained, and therefore if well founded must be just as acceptable as the facts. I have no new subject to bring before you at this time. This is the fourth convention which I have attended, and at each of the three previous ones I brought up three different subjects, and I have thought that by trying to bring these three different matters up to date on the present occasion I should do enough, and do what is perfectly adapted to the requirements of the present audience. At Picton, where I first was introduced to this Association by Mr. Cheesman, now of Boston, I discussed the testing of milk, which has since become an affair of very great importance. At the Seaforth meeting, which came next, the subject taken up was dairying in Denmark ; and on the last occasion, viz., at Berlin last year, I spoke of the fixation of nitrogen. Now, all these subjects are of the utmost importance to the agricultural community, and what I want to do on the present occasion is to say a little with reference to the improvement or advance that has been made in each of them.

Beginning first with the testing of milk and other dairy products I may say that we have done considerable work at the Inland Revenue Laboratory in the interest of the dairy industry of Canada since I discussed the matter at Picton. We have always been ready to test samples of milk sent to us by the dairy inspectors; but during the last year we have had little or nothing to do in that way. It seems either that there has been little or no adulteration going on, or that the dairy inspectors have been able to cope with the evil themselves. On the other hand I have had sent to me by Mr. Croil, a gentleman living at Aultsville, certain samples of milk which had been subjected to trial with the Babcock test. He also sent me the results of his tests to see how these corresponded with analyses made by myself by the gravimetric process. Now, these tests with the Babcock apparatus having been made by comparatively inexperienced persons, it seemed to me a good opportunity of comparing the results with those obtained by analyses, and I accordingly did the work and am able to present you with the comparison:

No. of sample.	Percentage of butter-fat.		
	Gravimetric.	Babcock.	Difference.
1	5.75	5.60	0.15
2	5.07	5.00	0.07
3	5.45	5.20	0.25
4	4.82	4.80	0.02
5	3.94	3.80	0.14
6	5.23	5.	0.23
7	5.73	5.60	0.13
8	5.71	5.60	0.11
9	5.05	5.00	0.05
Average difference	.....	.....	0.13

I communicate this statement because I have been informed that there is a disposition in some quarters to disseminate a prejudice against the Babcock method. I wish to state that this prejudice is altogether unfounded, and that the Babcock test, although giving a slightly lower percentage of butter-fat than the gravimetric analysis, is nevertheless in practical agreement with it. I scarcely need to say anything more on this subject, when it is remembered that a great many tests have also been made by Mr. Shutt, of the Central Experimental Farm, whom I am glad to see present and who is to give you the benefit of his experience.

Now with regard to the other subjects which I brought before you on former occasions, my principal reason for bringing them before you again is that on account of my acquaintance with Danish and German I have perhaps greater facilities for knowing what is being done in Denmark and Germany. It seems to me in fact, that I occupy the position of foreign correspondent to the Ontario Creameries' Association, and since I suppose there is no salary attached to the position, I might ask you, Mr. President, to appoint me your "honorary foreign correspondent." At any rate I shall attempt to fulfil the duties of such an office, and try to bring before you, so far as possible, the experience that has been recently gained in the foreign countries which I have mentioned. Although I have not had any encouragement from Canadian experts to believe that the Danish system of partnership dairying will ever be adopted in this country, still I think it wise to continue these annual reports from Denmark, because it is unquestionably the country which has the richest experience, has bounded beyond every other in production, and captured and kept possession of the English market. The manner in which this little populous country has increased its output of butter in late years is simply astounding.

In the annual report of this Association for 1889, at page 121, you will find, as stated

by me, the quantities of butter imported into England up to and including 1888. According to Boggild's reports the following are the importations since that year in English cwts. The figures are given for 1888 to facilitate comparison :

	1888.	1889.	1890.	Per cent.
Denmark.....	604,512	677,491	824,749	41
France.....	439,993	566,524	525,105	26
Sweden.....	205,847	212,141	224,235	11
Holland.....	155,020	151,073	156,069	7¾
Germany.....	160,915	111,027	104,450	5
United States	23,207	110,187	84,553	4
Canada.....	9,173	22,634	15,155	¾
Other countries ..	70,647	76,392	93,401	4½
	1,669,314	1,927,469	2,027,717	100

In round numbers England requires 100,000 tons of butter annually, and of this Denmark supplies forty-one per cent, and Canada only 0.75 per cent. Little Denmark supplies fifty-four times as much as big Canada, and England requires in all 135 times as much as Canada is able to furnish. With such figures at hand it is folly to talk of the U. S. market. Why ! the U. S. supply themselves and besides sell in the English market over five times as much as Canada does.

But, returning to Denmark, it has to be explained that the 40,000 tons of butter which she sends annually to England is not all the product of Danish cows. Like every individual district or country which gets credit for producing a good article, it is able to take care of some of its neighbors' products. Thus in 1889-90 Denmark imported from Sweden about eight and from Russia four and a half million pounds, most of which was simply transhipped to England. The best article is always sent there, and the inferior qualities either of their own or foreign origin are consumed by the Danes at home.

With regard to Denmark's own production, I have made up, from Boggild's reports, the following statement of it in Danish pounds by the quarter and by the year since 1877, a date prior to the time when the centrifugal separators came into use.

Period.	October Quarter.	January Quarter.	April Quarter.	July Quarter.	The Whole Year.
1877-78	4,009,600	2,464,000	4,681,600	7,907,200	19,062,400
78-79	3,270,400	4,032,000	4,569,600	6,092,800	17,964,800
79-80	3,919,600	5,196,800	4,245,600	5,376,000	18,738,000
80-81	4,233,600	5,040,000	5,648,800	4,592,000	19,514,400
81-82	2,956,800	4,412,800	5,084,800	7,100,800	19,555,200
82-83	5,174,400	6,720,000	7,996,800	6,764,800	26,656,000
83-84	5,600,000	6,115,200	7,190,400	7,100,800	26,006,400
84-85	4,457,600	4,748,800	8,400,000	7,168,000	24,774,400
85-86	5,969,493	7,887,423	8,671,445	9,705,119	32,233,480
86-87	5,173,124	9,707,739	9,983,791	10,219,408	35,084,062
87-88	8,143,670	14,133,968	13,035,053	11,914,995	47,227,686
88-89	8,899,671	14,595,838	15,055,030	13,162,606	51,713,145
89-90	12,137,417	21,297,156	15,469,119	16,589,575	65,493,267

Any one who will take the trouble to study this table after it is printed will be able to deduce from it many very interesting conclusions, a few only of which I am able to point out now. At Seaforth I was able to mention the astonishing fact, that in 1887-8 Denmark's butter production had increased over the preceding year by twelve millions of pounds. Since then the product has been increasing, and that of 1889-90 exceeded that of the preceding year by fourteen million pounds. This production of sixty-five and a half million pounds annually is three times as much as was made eight years previously. The recent increase has taken place for the most part in the winter months, and now there is produced in the latter more by one million pounds than in the summer.

This great increase has been accompanied by changes of the most advantgeous character for Denmark. Eight or ten years ago it was a country that exported grain ; now it consumes its own grain to a large extent for the production of butter and cream, and imports besides large quantities of grain and feeding stuffs. In 1889-90 it bought from foreign sources 124 million pounds of oil-cake and 239 million pounds of wheat-bran ; a total of over 180,000 tons of feeding stuff, chiefly for its milch cows.

The centrifugal separators and partnership system of dairying have brought home their advantages to the smallest herds, and the poorest cottar gets as high a price for his butter as the most extensive farmer. Universal satisfaction exists with the system and its results, which has spread over the whole country to such an extent that there is now no room for any more new butter factories, and very much is being done to improve the old ones. The farmer is no longer obliged to take all he can from his hungry fields, but is able to enrich them. He pays his way, and at the same time is able to lay by in the best of savings banks, his well-tilled fields, the plant food they can utilise so well, and upon which they yield high interest. All this has been done independently of growing corn or feeding silage, and with the disadvantage of having their home market, to a considerable extent, supplied with oleomargarine. Surely as regards these two last particulars Canada is much better situated than Denmark.

Of course there would be no use in going over all the points connected with dairying in Denmark which I brought under the notice of this Association at Seaforth. On that occasion, however, I made no refrence to the manner in which milch cows are fed in Denmark, and it will, I think, now be profitable to advert to this subject especially since a recently published work by Boggild, called " Maekeribruget i Danmark " (Dairying in Denmark) gives some interesting particulars regarding it. I have no doubt that what Prof. Robertson has to say this evening regarding the most economical way of feeding cows for butter making will be more profitabie for you to hear, being better suited to the surrounding circumstances than anything I can say on the subject. But still it may not be amiss for you to know a little as to the way in which Danish farmers look at it. It will be easily understood by you that Denmark had, at the time when it was a grain exporting country, to pass through that stage or condition of agriculture when cattle were kept in winter as " necessary evils," and chiefly for the purpose of transmuting straw into manure. In many parts of Canada agriculture has not yet got out of this stage, and milch cows are merely kept in existence in winter, which is just as reasonable a proceeding as keeping a mill or factory at work and trying to feed them with as little water or steam and to give as small a product as possible. After the age of grass, clover and hay came that of roots, which are now cultivated in increasing quantity in Denmark. These are especially beets, carrots, turnips and rutabagas.

It is the beetroot itself that is used in Denmark as cow fodder and not merely, as in Germany, the pulp, after the sugar has been extracted. The tops are not considered good as fodder, as they contain much water and are apt to induce looseness. The beet itself is a favorite fodder with the cows and has no unfavorable influence upon the quality of the resulting butter. Some varieties are said to be able to impart to the milk, and consequently to the butter, when fed in winter, a color almost as yellow as that which is caused by good pasture in summer. I have heard the same influence ascribed to the use of carrots in Canada, and by no less a personage than the Mayor of Berlin, where we met last winter. But strange to say this has not been observed by the Danes, at least it is not mentioned in Boggild's book. All that he says about carrots is that they are equally as good fodder for cows as beet root. With regard to turnips and rutabagas the yellow varieties are regarded as the best, although in nutritive qualities they fall far behind the beets and carrots. Turnips and rutabagas are much used for fattening stock but seldom or never given to the milch cows because they taint the milk and the cream and butter produced from them. The tops are considered to be very bad fodder indeed, and it is held that they decompose readily in the stable and impart an unpleasant odour to the air which is absorbed by the milk. It is only when turnips form a very small part of the nourishment which the cows receive that anything like satisfactory butter can be produced.

It is worthy of special mention, that the use of the silo is utterly unknown in Denmark. Indeed, I have been unable to find any mention whatever of feeding silage in Boggild's last book.

Besides hay, straw and roots the Danes have lately resorted very much to the use of what they call "kraftfoder" and which corresponds to the "kraftfutter" of the Germans. I do not know any equivalent for this term in English; literally it means "power fodder" but perhaps "strong fodder" would be a better rendering. It is used as a general term for grain, bran, oil cake, malt combings, etc., in contradistinction to pasture, hay, straw and roots. For stock feeding it is not more than twenty years since the Danes began to use roots, and similarly it is not more than ten since they turned their attention generally to making profit from "strong fodder." Tesdorpf was the first to maintain that it was remunerative to give the cows some grain in winter. As early as 1842 he asserted that it paid him to give a milch cow four tondes oats (equal to 560 lb.) during the winter. He maintained that 140 lb. (equal to one tonde) oats produced twelve pounds of butter, and another authority after him maintained that it could even give sixteen pounds. I have already made mention of the large quantities of bran and oil cake which the Danes now import, and will at present only refer to what are supposed to be the particular advantages of each sort of "power fodder."

Among the grains, rye, barley and oats have principally been used. Small admixtures of pea and bean meal have been given in certain places, but although these are rich in albuminoids, it is a very general opinion that peas and especially beans have an unfavorable influence on the quality of the butter, and are said to make it dry and bitter. On the other hand ground maize has been tried without any such effect having been observed. Ground rye is said to have the same bad effect upon the butter as peas and beans. No such objection is made to the use of ground oats, and it gives good results as regards the quantity of milk yielded by the cows, but its tendency is said to be too much in the direction of producing "scouring." This tendency is counteracted by barley, and a mixture of this grain and oats ground together under the name of "skraa" is the form of strong fodder from grain most in favor. To produce this mixture it is found quite advantageous to grow both these grains in the same crop, and this plan is said to succeed very well.

The tendency of oats to induce scouring is no doubt caused by the high percentage it contains of fat, which is at least five per cent., while barley only contains half as much. The "strong fodder" however, which is preferred by the Danes to all others, both on account of its quality and price, is wheat bran, the most of which is imported. So favorably is it regarded that many have maintained it to be equal in feeding value to the same weight of grain, an opinion which is not very much at variance with the results of chemical analysis. In any case however, it is very valuable fodder owing to its containing a high proportion of the albuminoids which in the grain are found nearest the outside scale. The cows prefer it to every other kind of "strong fodder," and it is found to have an especially favorable influence on the flavour and consistency of the butter.

With regard to the different varieties of oil cake, they are looked upon with a considerable amount of suspicion. These resulting from pressing the seeds while hot are not in favor; still less those which may have been damaged during transport. Danish experts have not much confidence even in the chemical analysis of oil cake, and recommend the farmers simply to taste the article offered them. That should indicate nothing of a musty or decomposing character, and the meal must be light colored. Among these oil cakes that from decorticated cotton seed is the least used, but it is the one most recommended by the Danish authorities as having a high nutritive value and coming into their market in the best condition. If it is considered to be a valuable feeding stuff in Denmark it ought to find even a greater application in Canada, being nearer its place of origin. I am informed that it is possible to furnish our consumers with it at one and a half cents per pound, and the sample I have seen certainly is fresh and sweet to the taste.

In general it may be said, that to produce a fine quality of butter the Danes never use any fodder of a damaged, musty or mouldy character, that they supply their cows

with plenty of good fresh water, and that the different feeding stuffs are given in such proportions as always to keep digestion in order, and to produce a soft but never a thin condition of the bowels. There is on record in Boggild's new book a description of most extensive experiments by the late Prof. Fjord, on cow feeding, but it is impossible on the present occasion to refer more particularly to them.

In view of the fact that much is now being said concerning the advantage of producing butter from sweet cream or milk as is done by the "butter extractor," it may be well to say a word or two regarding Danish experience in this matter. There was a time when some of the Danish dairies produced butter from sweet cream, because there was some enquiry for it and because the price paid was high. But latterly it has not been asked for and does not seem now to be produced in any Danish dairy. Therefore when Danish butter is described, it is understood to be that which is produced from churning ripened or slightly acid cream or milk. Such an amount of salt is added that the resulting butter contains generally from one and a half to two per cent. The Danish butter is therefore strictly speaking not perfectly fresh as the article is sometimes supplied in the English market. The term "fresh" must be understood to mean absence of salt, and not by any means that the butter has been produced from perfectly sweet cream. In fact it is very doubtful whether any butter has such an origin. Take even the finest French butter from the best pastures of Normandy and to which no salt has been added; it is certainly called "fresh" in the London market, and sometimes also "sweet," but it has no right to the latter term because it is churned from cream which is even very sour. This French butter is "fresh" and must be sold without much delay. The Danish is slightly "salted" in order that it may keep for a longer time.

The quantity of water in Danish butter is about fifteen per cent, but it can vary from ten to eighteen per cent without being either too dry or too wet or too much charged with water. It is a mistake to suppose that the butter from which water or brine exudes contains more water than that which does not discharge any water. It has been found by experiment that butter can contain as much as eighteen per cent. of moisture without discharging a drop of water, and other sorts containing only fourteen per cent. will allow it to run off. The Danes exact from well prepared, good butter, that when freshly cut it shall show numerous minute water points, but these should not be capable of collecting into larger drops and of running off independently. It is considered to be a fault in butter when it shows itself to be dry and hard, so that it is coarse grained and cannot be sliced easily; but it is just as great a fault if it has more water than it can keep to itself either when stored in a warm place or when shaken during transport. According to the Danish rule Canadian butters are for the most part deficient in moisture. The average percentage contained in 150 samples collected by the Inland Revenne Department, of the Dominion of Canada, in the summer of 1890 was only 8.97, say nine per cent, and some were as low as four or five. In these days when many varieties of food "are not always what they seem, and skim milk masquerades as cream," it is quite refreshing to find something which has not got water enough in it, and butter makers should strive to acquire the art of leaving as much as possible of a constituent in their product which improves its quality and does not cost anything. A great deal is said in Boggild's book about butter-working, which I cannot now bring before you in its whole extent. A good deal of it is founded on the microscopical examinations of butter of good quality by Prof. Storch. He found the fat in butter to be mixed with an extraordinary number of the smallest, finest globules of buttermilk or slightly acid milk serum. Their number is astonishing. Storch counted them, and found in a layer of butter having a thickness of only one one hundredth of a millemeter as many as three or four millions of these minute drops. Fancy such a number of these little points in a small piece of butter no larger than a pin head. These globules thus enclosed are not to be considered as water merely diluting the butter. On the contrary Storch finds them to be of the greatest consequence with reference to the quality and consistency of the butter. He has proved in the first place, that the water thus contained in good butter has a similar chemical composition to that of fat free milk serum. Secondly he has shown, that it is to this microscopic dust of buttermilk that butter owes its characteristic physical

properties and opalescent appearance. And lastly, he maintains that the chemical nature of these small drops determine the taste and smell of the butter, because the aromatic substances which are formed during the ripening of the cream are introduced by means of the buttermilk drops into the butter, while the butter-fat itself does not possess any very characteristic taste or smell as long as the butter is fresh. From all this it will be seen how much it is possible to learn about such a seemingly simple thing as the churning and working of butter from the investigations and experience of our competitors in the business. In all human affairs experience is a thing which mankind is too prone to neglect, and yet there is nothing so profitable as to well weigh the experience of others; to avoid their errors and imitate their successes.

With reference to churning and working butter as it is performed in Denmark, perhaps it may be worth while to say a little. As has been already said the cream is always allowed to ripen or sour, partly because a larger relative quantity of butter can be produced from it, but principally because its taste and smell or aroma are improved. The ripening consists in a lactic acid fermentation the bacteriology of which has been the subject of much study, but into that I cannot enter now. Nor is it possible to attempt to give a description of the various churns used. In every case the object of churning is to get the microscopically small globules of fat to join themselves together into small grains or lumps of such a size that it is possible to collect them, and so that the enclosed or adhering butter milk can be separated to the extent required without injuring the quality or consistency of the butter. The time required is from thirty to forty minutes, and the temperature from ten to twenty degrees Centigrade, or between fifty and sixty-eight degrees Fahrenheit, but between these limits it is always sought to produce the butter at as low a temperature as possible. The churning is stopped when the butter appears in grains of the size of clover seed, or in some cases, where the cream is rich, of the size of very small peas, and every effort is made to produce these grains as much as possible of a uniform size. It is said that if the butter is churned until the grains become flat or kidney shaped it is difficult in working it afterwards to produce a clear and shining product. It is then liable to become thick and dull. When the churn is opened the smell of the contents is often found to guide the operator as to whether or no the most advantageous degree of acidity has been reached in the ripening of the cream, and whether any correction has to be applied either in the treatment of the cream or the feeding of the cows. The first thing which is done after opening the churn is to wash down the upper parts of it with water which has been boiled and then cooled down to the temperature which the cream had before churning. The Danes are very particular in regard to the water which is brought into contact with the butter, and the boiling is for the purpose of killing any bacteria which it may contain. The butter is taken out of the churn by means of a sieve with a hair-cloth bottom, through which the buttermilk escapes, and through which at last, when the churn is being emptied, the whole of the buttermilk is passed so that no butter grains are lost. The butter thus taken out is placed in a butter trough, and very seldom is it subjected to any washing. The washing of the butter in the churn, either with water or brine, as done in France and many other countries is not generally practised. When in some few cases anything of this sort happens it is done by immersing the sieve containing the butter as it is lifted out of the churn, in a tub of water (which has been boiled and cooled) placed at the side of it. This water thus comes to wash away the buttermilk that lies on the outside of the heap of butter, and is easily shaken out of the sieve again. As a rule even this washing is seldom performed, and in consequence a certain quantity of the buttermilk accompanies the butter to the working table. This table is the ordinary American revolving table which is said to have been much improved by the Danes. The working simply consists in the squeezing out of the buttermilk, up to a point which the operator judges by practice to be sufficient. After this the butter is weighed in the butter trough preparatory to salting. The salt is measured in a glass, graduated in so-called "qvints;" a qvint is equal to five grammes, and from three to six of these are used for every pound of butter. Four and a-half would be equal to twenty-two and a-half grammes, or about one-twentieth of a pound. This corresponds to about five per cent., although not more than half of this is found in the resulting butter. The salting is sometimes added in the butter trough, but,

always finished by passing under the roller of the working table. The longer the butter is to be kept, the more salt is used, and the lower the quality of the butter, the more salt is added to cover its defects. Of course a large proportion of the salt goes away in the brine which is squeezed out.

After salting, the butter is laid away a certain time, partly in order that the salt can get time to dissolve, and partly in order that it may become so solid that by a second working a further quantity of butter-milk and brine may be removed. This operation may be repeated, provided always the over-working of the butter is avoided, a point regarding which the Danes are very particular, and which requires considerable practice to know. The amount of working which the butter can bear from the beginning depends partly upon the character of the cows, their feed, the time of year and the churning, but for the same quality of butter it depends principally on the temperature. The higher the temperature in the working-room, the more careful it is necessary to be to avoid over-working. In many dairies it is customary to give the butter only one working over, from two to four hours after it has been salted, but it is generally supposed to be best to work it over at least twice, both for the sake of the consistency and the appearance of the product.

As an integral part of the Danish system, mention must also be made of the great increase of the production of bacon for the English market. In the season of 1880-81 Denmark exported 4,000,000 pounds of bacon; from 1887 to 1890 the annual production was over 60,000,000 pounds—fifteen times as much as ten years ago. Of course this enormous increase was accompanied by a diminution in the export of live hogs, but nevertheless, taking both products, the quantity exported has doubled in ten years. The quantities which have been mentioned are to be understood as export excess, for the amount imported has been deducted. The total export of swine products now represents a value of about $7,000,000 annually, or about half the value of the annual export of butter. Butter and bacon may therefore be regarded as the agricultural staples of Denmark, to the increase in quantity and improvement in quality of which the indefatigable exertions of the authorities are directed. The Danes have not much to learn from other nations regarding butter, but in the production of bacon they do not regard that industry as in a satisfactory condition. And where do you think they go to learn and gain the experience necessary to enable them to conquer and hold the English market? You would scarcely guess. Well, it is to Ireland, and in the last book which has been published in Copenhagen on the subject, which I have so often mentioned Böggild gives a most interesting account of Irish methods, both as regards the feeding and breeding of swine. The author does not recommend his countrymen to imitate the Irish slavishly, but he points out that they have made greater progress in the production of bacon than the Danes, and by the use of less expensive means.

I presume that what Böggild relates will not surprise us, who have been aware that Ireland is the country where the pig was first educated, and that the pig is to the Irishman what the horse is to the Arab. Pigs and potatoes involuntarily present themselves to our minds when we think of the Emerald Isle, and I remember a friend of mine quoting a grace before meat which recalls a similar picture:

> Let us all thank the Lord and repent of our sins;
> Peel the potatoes and throw out the skins;
> The skins feed the pig, and the pig feeds you;
> Dearly beloved brethren, isn't this true?

Of course it is not to be supposed that Danish bacon is exclusively produced from the skim-milk of the partnership dairies. But there is no doubt that their bye-products most powerfully contribute in conjunction with good Danish barley and other grain to swell the export quantity of bacon. These bye-products include skim-milk, butter-milk and whey, and all of these that are not used in house-keeping or in feeding calves, foals, or poultry is very carefully saved for the benefit of the swine. Some of you may perhaps be surprised at the mention of foals in this connection, but it is the fact that in those districts of Jutland where horse-breeding is practiced, it is very often the practice, in

order to be less hard on the mares and forward the growth of the foals, to begin quite early to give these a little warm skim-milk, and thereafter, in a comparatively short time, to take them from the mother and let them live on a little hay, cut straw and oats, besides half a pail of boiled skim-milk two or three times a day.

With regard to the relative value of the various feeding stuffs used for producing bacon, the Danes have instituted and carried out some of the most extensive and thorough practical tests on the subject, the particulars of which would no doubt be of the greatest interest to our farmers. At present it is impossible to mention more than a few of the net results, and perhaps these, if given in a concentrated form, are more likely to imbed themselves in your memories. The Danes now consider it as well established that in feeding pigs for bacon one pound of grain—say rye or barley—is equal to six pounds of skim-milk, or twelve pounds of whey. No doubt wheat would be equally as good for the purpose as rye or barley or oats, but the latter grains are the cheapest here, and probably would not cost more than one and a-half cents per pound. Therefore it follows that the value of skim-milk is about one-quarter of a cent per pound, and of whey one-eighth of a cent.

Possibly all this will remind many of you of Professor Robertson's views on the subject, and of the praise he bestowed on the hog as a farm adjunct a few years ago at the Picton meeting of this convention. Well, the facts which I have brought forward only prove the excellence of the Professor's recommendations, and that while his countrymen have been taking time to consider them, the Danes have independently found out their value, and set to work to make money by their means.

Before taking leave of Denmark I desire to point out to you one of the causes of its recent extraordinary agricultural progress. This I conceive to be the close sympathy and cordial alliance which has existed between the scientific men and the practical farmers. Not only is this evidenced by the instructions given to the three consulting scientific dairymen who have been appointed by the Government in different parts of the kingdom, but also by the manner in which the experimental work of such men as Segelcke Storch and Fjord has been carried out. Many of Fjord's experiments were carried out in the buildings of private farmers before their eyes, and at once carried into regular practice by them. It is gratifying to observe that in Canada a partnership of the same character is beginning to be established, and no doubt by the exertions of such men as Saunders, Robertson, Mills and Shaw, and by such meetings as the present, our Canadian farmers will be stimulated to the introduction of such improvements in their agriculture as will make them worthy rivals of the shrewd agriculturists of the little European Kingdom which lies betwixt the Baltic and the North Sea.

A Voice.—Is the book from which you have quoted printed in English?

Mr. Macfarlane.—No, in Danish.

The Same Voice.—There is no translation of it?

Mr. Macfarlane.—No translation of it has yet been made, but I think it would pay the Government of Canada, or of this Province, to translate and publish it.

Mr. Wenger.—You compared the values of whey and skimmed milk. What is the value of butter-milk as compared with whey?

Mr. Macfarlane.—I have no doubt the figures are given in this book, because it is brimful of figures, but I have not extracted them for the comparison you want. Besides you know there is a great deal more skimmed milk and whey used in feeding than there can be of buttermilk.

Mr. Bowie.—Does not the package have a great deal to do with the sale?

Mr. Macfarlane.—Mr. Bowie has touched a point upon which I could have given a good deal of information. I know from my reading of Danish literature on the subject that the packages used in Denmark are altogether different from those used in Canada. The "tonde" is equal to 225 lb., and the butter is packed in one-third, one-quarter, and one-fifth tondes. Usually they are in one-third tondes and contain about

72 lb. I think that is the prevailing package, but I am not able to say whether it is preferred in England. I would not suppose that it has so much to do with the acceptance of the butter in the English market as the character of the butter itself.

Mr. MACDOUGALL.—What is the temperature of their winter months as compared with ours?

Mr. MACFARLANE.—From my own experience—having lived four years in Norway, and passed through Denmark—the former is much further north, and with climatic influences very much the same as in Canada, I should suppose the winters in Denmark would not be so severe, nor would they have it so hot in summer as we have in Canada.

Mr. MACDOUGALL.—How long have they milk?

Mr. MACFARLANE.—They milk the cows as long as they can, and the period goes from 11 to 12 months.

Mr. MACDOUGALL.—About what does wheat and bran cost there?

Mr. MACFARLANE.—I am sorry to say I cannot answer that.

Mr. BISSELL.—What kind of cattle do they use there to make that good butter. Are they not Holsteins?

Mr. MACFARLANE.—They resemble the Holstein cow in some respects, but they are not really the same breed. They are called by Boggild the "Danish red milch cattle," and have been developed from the native breeds of Schleswig, Jutland and the Danish Islands. In fact the Danes make use of the cows native to their country, having taken them just as they found them, and they are still improving them and trying to produce from them just as much butter as they know how. I do not think it is a breed of cattle that has gained celebrity in any other country.

The PRESIDENT.—Don't you think there is more in the meal bin than in the dairy cow?

Mr. MACFARLANE.—Yes, that would seem to be the case from the experience obtained in Denmark.

Mr. MOYER.—Mr. Macfarlane said that the Danish butter contains more water than the Canadian butter. What is the reason for that? Do they know better how to manufacture the butter? Is it an essential quality in the butter, or is it something so natural to the climate or country that we cannot produce that water? Would it be an improvement to our butter if it contained that additional water, and could we manufacture it in such a way that it would contain the same quantity of water as Danish butter. In cutting butter in the city I notice that sometimes it cuts clean; and in other samples it sticks to both sides of the knife like putty. What is the reason for all this? We have this difference in butter made in the same country, and it must be in the manufacture. If it improves the butter to increase the amount of water that is a point to which the farmers will all "catch on," because they are honest when it pays, as we heard yesterday.

Mr. MACFARLANE.—I think it a little hard on me to put these questions. I have got my own ideas from reading more than from practice, and they may be right or wrong, but I would say that the quantity of water contained in the butter of Denmark is sometimes the same as in the butter produced in our own creameries. Creamery butter here contains about the same quantity as a rule. When I spoke of 9 per cent. of water I spoke of the whole of Canada, and as the butter is largely produced in private dairies it follows that they are largely responsible for the low average. There are some of the Canadian creameries which have produced butter with as high as 14 per cent., and I remember examining from a factory in which Laval separators were used, a butter which contained 16 per cent. of water. So I think if the butter was all produced in creameries the average would come up so far as the water it contained is concerned.

Prof. DEAN, being called upon for his views with regard to this point, said he did not think it hardly fair to call upon him to give his experience, which was nearly alto-

gether in private butter making. But I can tell you, he continued, that the amount of water that is left in the butter depends more on the person that is manufacturing it than on anything else. We made some analyses, last summer, and found a big difference. To give my reasons for thinking as I do—I had a man in the experimental dairy at the Ontario Experimental Farm for two or three months. He got tired and went away. A new man came along, and was given instructions to make the butter exactly under the same conditions as the former man had done, and when we came to examine his make we found a great difference in the quantity of water it contained as compared with that of the first maker. Therefore I would say the quantity of water depends considerably on the man. Then, another thing I found in my experience last summer was that when I got into a room in which the temperature was 80° or 85° with a lot of people around us and used a large quantity of cold water we could get a butter that was firm. I found if we washed the butter in the churn with very cold water there was always a lot of water left in the butter. Is not that your experience, Mr. Hannah or Mr. Wenger?

ANSWER.—Yes.

Prof. DEAN.—Now, if it is a good thing to have a large quantity of water in the butter, one way to get it would be to wash the butter with as cold water as you can get.

Mr. MACFARLANE.—The Danes do not wash at all. They do not introduce water. The water in the butter is from the milk serum or the buttermilk. It is the exception to use water at all for washing the butter. The water it contains is taken from the milk.

Mr. MOYER.—Would that not make the butter streaky?

Mr. MACFARLANE.—It does not seem so, for the Danish butter has the best reputation, and is preferred in London.

Mr. MOYER.—We get some butter in the city out of which, when you cut it with the knife, the water runs over on the counter. I usually think the makers of this butter have not washed it enough and that this water which runs out is part of the buttermilk which remains in the butter. That was a very interesting experience that Prof. Dean spoke about—the difference of water in the productions of two different makers.

Mr. MACFARLANE.—You must take into consideration the process of the Danes, because I must again mention they never use fresh, natural water to wash the butter.

Mr. MOYER.—But in the experience at the Model Farm, which Prof. Dean mentioned, if the butter that contained the more water was the better butter, I would want the butter-maker who made it.

CREAM AND ITS TREATMENT.

Prof. DEAN said: I am going to talk about cream, and give the results of some experiments conducted by myself in regard to cream and ripening by Boyd's process. By way of introduction I shall define what cream is. I would define it simply as milk containing a high per cent. of solids. In the first place, what are some of the conditions affecting separation? You know that we must adopt some means to separate the cream from the milk. There are two methods of obtaining the cream from the milk—the mechanical and the natural. Usually there are two natural means adopted, namely, by the use of the shallow pan and the deep pail. I want to speak of one or two conditions affecting the cream by the deep setting methods. I find that the cow has a great influence on the completeness of separation. Let me give you the results of experiments with our own cows. In the average of thirty trials with six of our cows there was left 0.26 per cent. of fat in the milk. As an average of twenty-seven trials with five others of our cows, there was left in the milk 0.80 per cent. These samples were all set in deep pails under the best conditions, and the milk handled by the same persons. So we find there is a difference in the cows. We had one cow that left 2.26 per cent. of fat in the

skim milk as an average of five trials. Now, that cow would not give up her fat by the common gravity process—the use of deep setting pails. You can see with such a cow if our milk were set under ordinary conditions there would be left about $\frac{2}{3}$ of her fat in the skim milk. When the milk of this same cow was mixed with that of another which creamed very rapidly the loss was only .70 per cent. This experiment would seem to indicate that in the case of poor creamers if you will mix their milk with that of cows' milk which creams readily and completely, you will get better results than if you set the two separately. This is one thing we find affecting the separation of cream from the milk by gravity methods. I may say here that some cows' milk in which so large a percentage of the fat was lost by natural method, when put through the separator (the one we used is what is now known as the " Baby Separator ") it was perfectly separated, and the separator will take out the cream almost completely from the milk of any of our cows. It will leave only about one-tenth of one per cent. of fat whether they are naturally good creamers or not.

There is another thing I find. We have been trying to ascertain recently whether the separator will do as well when the cow has been milking a long time as the deep setting process will. We find that by the very best process of separation by natural methods there would be five-tenths to six-tenths of one per cent. of fat left in the skim milk, but on running the milk through the separator it would take out the fat almost completely. You can see, therefore, that with a herd of ten or fifteen cows the difference of fat realised by running the milk through a separator would not take long to pay for a machine.

We have always been taught that it is necessary when setting milk to set it while it is warm, and that if you do not do that the cream will not rise so perfectly. Well, we did some experimenting in that connection, too. I found in an average of four trials when the milk was set at eighty-nine degrees, or as soon as possible after milking, there was left 0.45 per cent. of fat in the skim milk. As an average of four trials, where half of the same milk as just mentioned was set at eighty-one degrees, the per cent. was only 0.54 per cent. When the milk had been allowed to cool down eight degrees we obtained about the same results in creaming; the milk being set for twenty-four hours in every case. When set immedietely after milking at a temperature of ninety degrees there was 0.49 per cent of fat left in the milk as an average of five trials, and as an average of five trials when set for some time after milking, at sixty-two degrees, the per cent. left was only 0.63. In every case the milk was thoroughly mixed up and set in a Cooley creamer. We found it did not make much difference whether the milk was set at once or kept for some time.

At an experiment station elsewhere they have obtained similar results. This immediate setting has always been a point upon which there has been great stress laid, but so far as my own experiments or those of other experimental stations have gone it does not seem to make so very much difference, although I would always advise people to set as soon as possible after milking so as to get away from odors. It would not pay, however, to go to a great deal of trouble to set immediately. Two of the conditions affecting separation, therefore, are the cow and the methods used.

Having got the cream the next thing is, what are we going to do with it? Shall we churn it sweet or ripen it? We have not tried the extractor yet, but we churned some sweet cream, and I want to lay before you the results of that work. There is a difference in the length of time required to churn, depending partially upon whether the cream be sweet or sour. But you can churn sweet cream just as effectually as sour cream if you have a low temperature, and the lower the temperature within churning limits the longer the time required to churn the sweet cream.

As an average of eight trials with sweet cream, where the average temperature was fifty-four degrees, the time required was one hour and fourteen minutes. As an average of three trials of sweet cream where the temperature was sixty-two degrees the time required was thirty-two minutes, so that if you raise the temperature you will churn sweet cream just about as quickly as ripe cream; but how much butter have you left in the butter-milk? In an average of three trials where the churning was done at a temperature of fifty-two degrees the average per cent. of fat left in the butter-milk was 0.36; and at a temperature of sixty degrees it was 1.50 er cent.

Thus, when you churn sweet cream at fifty-two degrees these experiments would indicate that you will take out the butter as effectually as you will from cream ripened and churned at sixty-two degrees.

We tested the butter-milk while out with the Travelling Dairy, and as an average of thirty-five samples we left in the shape of fat 0.62 per cent. in the milk. The lowest was 0.20 per cent. and the highest was 2.60. There were some cases where we left $2\frac{1}{2}$ per cent. Let me show you how we left it. We had a meeting at Orono and found that no cream had been supplied for the work. We went out to find cream and visited one house and another getting two or three quarts here and two or three quarts there until we had quite a quantity of cream from different places. Some of this cream was just taken off the pan and some of it was very sour. We mixed all of it together and took it to the meeting and churned it and the result was that $2\frac{1}{2}$ per cent. of fat was left in the butter-milk. How many people through the country take the sweet cream of the morning on which they are churning and mix it with ripened cream? The result is that the sour cream will churn more quickly than the sweet cream, and in this way a large part of the fat is lost. Yet this is a common practice with butter makers. They think it does no harm to mix this cream at different stages of ripeness and then churn it.

Now, while I am on the subject of sweet cream, let me say a word about the keeping qualities of sweet cream butter. We churned altogether, I think it was about two tubs —thirty-five pound tubs. I found it would not keep, and the longer it was kept the worse it got. Some of it we put up in parchment paper in pound packages. I found this did not keep either. This and all the sweet cream butter went off flavor in from four to six days. Some of that butter was obtained from sweet cream separated by the setting methods and some by a centrifugal separator, and we found no difference in the keeping qualities by either process. Now, I do not wish to say that this result is something which will not be overthrown, because I intend to continue the experiment, but as the result of last year's experience I am led to the conclusion that sweet cream butter will not keep.

What is the ripening of cream? The common practice through Ontario is to ripen the cream. What does that consist of? There is a great field for experiments in this line. I do not think there is anyone in Canada making a special study of bacteria in connection with the dairy. These organisms get into the cream and cause it to sour. There is about four per cent. of sugar in milk, and they act on this sugar causing it to from lactic acid. The next thing is this lactic acid causes the casein to precipitate or curdle. There is another thing which occurs as a result of these organisms, and that is we obtain an aroma, some of which may be a bad aroma, in the cream.

Well, now, what are the most favorable conditions for carrying on this ripening process? How shall we ripen the cream? Will it be by exposing it in the air in an open can or keeping it in a closed vessel? By Boyd's system the cream is placed in an almost air-tight vat which is also a non-conductor of heat. Besides the ripening vat there is a small can or vat which is known as a fermenting can. Into this he recommends putting fresh skim milk and heating it to ninety degrees. At the end of a few hours it will be quite thick. Take about two per cent. of this thick skim milk, add it to the cream and stir it through thoroughly, and put on the cover of the cream vat tight. I have found that the addition of a little sour cream is less trouble and will answer the purpose.

Has this process any advantage? I have not found it to increase the quantity of butter produced, but I think I did find this, that the butter made from the cream made in the Boyd vat had a richer flavor. I think the butter made from the cream ripened in the closed covered vat has a richer flavor than that ripened in the open vat. How do you account for that? All flavors or odors are due to volatile substances. These volatile oils going off where cream is kept in an open vessel are apt to produce butter lacking in flavor. In a closed vat or vessel they are kept right in the cream and when you take off the cover you will find it has a rich aroma and I think it is retained in the butter.

Have we been making a mistake by ripening the cream in open vats, and would it pay to ripen it in closed vats? I know there are objections to this method. If the vat is not open bad odors are apt to be kept in the cream. As the result of my own work I know that where the cream has been properly handled there has been no such result.

Mr. Row.—At the time you were testing those cows did you find, say, to-day you derived so much cream, and to-morrow you would not get within a pint or a pint-and-a-half of the same amount of cream?

Prof. Dean.—I do not think you can tell much about what cows are doing by the quantity of cream they give. That is if you get one inch of cream from one cow it may not give so large a percentage of butter-fat as half an inch of cream from another cow. Take an ordinary shot-gun can and let it stand for twelve hours, and there will be a certain amount of cream on your milk. Then, if you will let it stand for twenty-four hours, there will be a less amount of cream. Does that mean that you have less butter? No; it simply means that the skimmed milk has settled down out of the cream and the cream has a greater density.

Mr. Hunter.—Does the adding of warm water at the proper temperature when set in the deep setting pails assist in the separation?

Prof. Dean.—I have done no work of my own in that connection, but as a result of the experiments at Cornell they have found that it did not help the raising of the cream to add water.

Mr. Hunter.—Does the cream of the same cow differ in quality?

Prof. Dean.—Yes. The cream that rises first is best.

Mr. Hunter.—Could a part be classed as first quality and another part as second quality? To make it plainer let me state it in this way: Take a deep setting can; will the first cream that rises be of a better quality than the cream which rises afterwards? Can we suppose that the cream of the same setting is of two different qualities?

Prof. Dean.—I am not able to answer from my personal knowledge, but men who have studied the subject think so and prefer the cream that rises first.

Mr. Hunter.—Then it would bridge the necessity of exhaustive creaming if the last creaming is of very little value.

Prof. Dean.—In the first place, I would say that some people, and if they leave any of the cream, imagine they will lose a little bit of butter and feel that they are being ruined. I would recommend these persons to get it all out. In the next place I would say that I am not sure that the presence of the extra cream would make any appreciable difference in the quality of the butter. You might not make or lose anything by not getting all the cream.

The President.—But you can obviate that difficulty by means of the separator?

Mr. Hunter.—Then, we know that with exhaustive separation there is a considerable amount of time lost. The Professor spoke of the effect of putting freshly skimmed cream in with cream that had reached a highly acid state and churning immediately afterwards, stating that by this method we lost to a large extent the butter-fats of the cream that had been put in last. Would that injure the quality of the butter of the ripened cream or make it more difficult to churn? You are confident, and I suppose we all are confident, that cream fresh skimmed off the can when put in with cream that has ripened will require some time to take on the acid. Then you have made clear to us that it is advisable to churn the sweet cream at a low temperature. What I wish to know is, would it injure the acid cream to churn it at that low temperature?

Prof. Dean.—I am not sure you would injure it. I think the ripened cream would churn first, even at the lowest temperature. I do not think that when you stopped the churn you would have the butter out of the sweet cream.

A Voice.—Would that sweet cream affect the quality of the butter?

Prof. Dean.—I think it would.

Mr. Wenger.—In deep setting, by using water 40 degrees and 60 degrees, which milk would cream cleanest?

Prof. Dean.—To obtain all the butter, I would prefer to have the temperature down to at least 45 degrees. If cooled down to that extent in the early part of the season then the butter would be taken out quite clean.

A Voice.—For what time is it necessary to set the milk?

Prof. Dean.—If the temperature is down to 45 degrees the cream will nearly all rise in six or eight hours if the cows have not been milking too long.

Mr. Brown.—Could you not get the cream out of the milk at a temperature of say 40 or 45 degrees in less than twelve hours?

Prof. Dean.—We have done some work in that connection. We have tried and found that in six, seven and eight hours the cream did not all rise.

Mr. Moyer.—I am glad the Professor mentioned this about the milk being set at a lower temperature. I was formerly of a different opinion, but last summer I noticed that in the case of milk sent to the city which had been chilled at home, the cream would rise on the can to as great an extent as I ever saw it in the country in not over two hours in my store. There would be just as much rise as if the milk were taken right from the cow. The cream seems to rise much quicker when it has been standing some time.

Mr. Wenger.—What we want to get at is how to get all the cream that is possible. It makes no difference whether the milk is set six or twelve hours so long as the cream is furnished in proper condition and we get out of it all there is to be got. I induced a number of my patrons to lay in a store of ice. They got 70 to 80 per cent. more—one getting 100 per cent more—and they made more money from having their milk in that way.

Mr. Macfarlane.—I have been very much interested in the results that Prof. Dean has given us in regard to cream rising, and especially in those experiments with reference to the rising of the cream in milk from different cows, and I have been wishing that some one would ask him whether the slow rising cream did not act in that way on account of an especially large quantity of other solids, whether it was not because the milk itself was rich and thick that the separation did not take place; because I know in Denmark it has been found that by adding an equal quantity of cold water to the milk you equalise the qualities of these different milks because you have reduced their specific gravity. It is a fact that they always add an equal quantity of water before they put the milk in the centrifugal machine.

Mr. Sprague.—I would like to ask is it not accounted for by the large amount of fibrine in the milk of some of the cows?

Prof. Dean.—In regard to Mr. Macfarlane's remarks, we did not determine the solids other than the fat, so that I am not able to tell whether it was on account of an extra amount of solids, not fat or otherwise. The cow was milking about six months, so that would have some influence in the cream rising, because, of course, the longer the time the cow has been milking the harder for the cream to rise.

Mr. Macfarlane.—Prof. Dean has also told us that his exertions lately have been devoted to the service of private dairying, and he has shown us that however imperfectly the cream might rise in private dairies the difficulty was overcome so soon as you applied the centrifuge. It seems to me a matter for regret that the Professor has spent so much of his time in the private dairies, because it is not in that way we will ever have uniform butter, and though we succeed in getting the best quality of butter in private dairies, that is only one-half the battle, because you will only have got it in small quantities and can never realise the best price such as you will obtain for it in large quantities. That is the experience they have gone through in Denmark. In order to hit the mark you must not use a shot gun; you have all got to use a rifle and point at the same bulls' eye.

Prof. Dean.—I agree with some things that Mr. Macfarlane has said. In my work last summer in connection with the Travelling Dairy, I always laid it down somewhat as follows: The first thing I said was we are endeavoring to help the farmers to improve the quality of their butter for the local markets, and you will never be able to produce an article for export until it is made in creameries. But there are thousands of people in Ontario and Canada who want butter, and why should they not be provided with a good article. We do not want to sell all we make to Great Britain. There is plenty of room for improvement in the work of private dairies. I believe the butter would be far better

made in the creameries, but the conditions do not seem to be favorable in some sections. Take those parts of Ontario where they have poor roads and the country is thinly settled, I do not think creameries would pay. So that I say private dairying wants renovating and improving, and I believe the Travelling Dairy is doing a good work in that connection, and it is the intention to continue this work. What relation has that work to the work of these factories? It will be the means of educating people how to take care of their cream. What will be the result when the local market has been supplied? Then the milk will be sent to creameries. But what has been done in the meantime? These farmers have been educated how to take care of the cream. What is a great source of trouble in creameries at the present time? It is that creamerymen cannot get good cream to make butter out of. I repeat that by going around in this way among the farmers and illustrating and educating them as to how to take care of their cream, we will get better butter for the local markets, and when the local market has been supplied we will get better creamery-butter for export.

The Convention then adjourned until the afternoon.

AFTERNOON SESSION.

The Convention resumed at two o'clock.

FODDER CORN AND ITS VALUE AS A CATTLE FOOD.

Mr. Frank T. Shutt, M.A., Chemist to the Dominion Experimental Farms, was introduced, and gave a practical and valuable address on the above subject, illustrating the same with tables, which are herewith presented. He said:

What I want to do is to bring before you, briefly, the results of some experiments carried on both in the field and laboratory at the Central Experimental Farm at Ottawa during the last two years with the growth of the corn plant. I do not know if I could have selected a subject more important, especially at the present time, and I will give you a few reasons why I think so. We must all recognise that the primary and fundamental object of all farming is to produce the largest amount of the best material at the least cost, and that material, in the first place, is plants. Next, we have to realise that plants feed, just the same as animals do. They draw their food both from the soil and from the atmosphere. Their food from the atmosphere is abundantly supplied. It is a supply over which we have no control whatever; but with regard to the plant food in the soil it is altogether another matter, and the regulation of this is very largely left in our hands. Large, abundant crops depend chiefly upon two factors—the fertility of the soil and a favorable climate. The climate we do not seem to have much control over at present, although the day seems to be arriving when we shall be able to moderate the excesses in matters of temperature and rain-fall by means of forestry. I will not speak to-day of the results of climatic influences, however, but will devote a few moments to the consideration of the fertility of the soil.

Now, when we once realise the fact that plants require food, we must, at the same time realise that every crop to a greater or less extent exhausts the soil of fertilising elements. With every crop we sell off the farm we are parting with a certain amount of plant food taken out of the soil—really part of our stock in trade.

When such a course is kept up for a long series of years it must entail exhaustion of the soil to a greater or less extent, and a gradually decreasing crop yield.

The question then arises how to increase the fertility of the soil—in other words, how to increase the plant food in the soil. The solution to the question principally lies in the fact that we must keep more stock; that we must not devote ourselves entirely to the raising of grain and hay; but that we must introduce more universally the practice of

mixed farming, and depend for a revenue more largely upon the sale of cattle and their products—milk, butter and cheese. All this is leading up to what I want to emphasise—the importance of corn fodder as food for cattle. You have followed me so far in my argument, which is that we want a larger number of cattle on the farm. Now, how does the keeping of a larger number of cattle on the farm increase the fertility of our soil? Because 80 per cent. of the food which the plants have taken from the soil is returned to it in the form of manure.

Then the next question is—if we are to introduce this practice of mixed farming—how are the cattle to be fed most economically—what is the cheapest food we can grow on our farms to obtain the largest returns? Well, I am going to answer that question by trying to show you the value of fodder corn as a cattle food—not as a complete one, but as an important element in such—both for the production of flesh and of milk. But there are other reasons why I should urge mixed farming upon the farmers and dairymen of this district and throughout this country. One of the chief of these is that it is a poor plan for us not to be earning money all the year round. The present system of farming seems something like a shopkeeper who would close his shop for three or four months of the year and take holidays. We, as farmers, have not a revenue all the year round, and are living through the winter months largely upon what we have earned during the summer. There are many minor points I might bring forward, of course, showing the advantages to be derived from winter dairying, such as of employment of labor throughout the year. We all know the difficulty there is in getting labor just when we want it most. I believe we could, by the raising of stock and dairy products, profitably employ men during the winter season, and by thus keeping them on the farm do away with the trouble and annoyance we have of finding help in the summer months.

Now, to proceed to my subject, I would say that in 1890—two years ago—we instituted some plot experiments with fodder corn on the Farm at Ottawa, with two objects in view, viz.: First, to ascertain what difference, if any, there might be in the feeding value of several varietes of Indian corn; and, secondly, the period of growth at which it would be best to cut that corn for either preservation in the silo or as a fodder in the dry condition.

We experimented with seven varieties of corn, grown under similar conditions, and cut them at different dates. The products were carefully analysed in the laboratory, and these results have been averaged and put together in tabular form as follows:

Digestible matter per ton of fodder corn (average of seven varieties) at different stages of growth in 1890.

Date of cutting.	Albuminoids.	Fat.	Carbo hydrates.	Fibre.	Total.
	lb.	lb.	lb.	lb.	lb.
Aug. 26	26	3	144	77	250
Sept. 19	27	5	176	90	298

This table, as is seen by the heading, shows you the amount of digestible matter per ton at different stages of growth. That is to say, we first cut a portion of the plots of corn on the 26th of August, and this table gives us the average composition of them at that date. We cut the remainder on the 19th September, and the second line of the table denotes the amount of digestible matter in the corn taken at that date. Now, what strikes one most forcibly is the increase in the total amount of digestible matter, or real cattle food, per ton derived by allowing the corn to proceed to a more mature state. We have here 250 pounds of digestible matter per ton in the corn cut on August 26th, and 298 pounds in that cut on September 19th. We have an increase of 50 pounds per ton, or one-fifth per cent. of its food constituents, by allowing the corn to grow. We see, then, that it would be a poor policy to cut the fodder in an immature condition, or before it reaches the glazing stage, which is when the kernel has become glazed and the leaves at the bottom of the stalk are beginning to turn yellow.

In all fodders we have constituents which are of value as cattle food—real food—and we have certain elements which cannot be said to have any monetary value. For instance,

we have water, to which we assign no value; but after that has been deducted we have the dry matter, or real cattle food, and consequently, assuming that any two foods have dry matter of like composition and digestibility, that which has the larger amount will be the more valuable of the two. Now, the results of these experiments show that the composition of this dry matter varied but very little in the chief varieties of Indian corn when analysed at the same period of growth; so that between one variety and another we cannot draw any strong line of distinction as to the relative value of the dry matter at the same stage of development. Consequently the corn we want to grow is the one containing the largest amount of dry matter per ton or per acre. Let us for a few moments enquire into the value of fodder constituents. Our chart shows us, in the first place, a number of pounds of albuminoids, in the second place fat, in the third carbo-hydrates, and in the fourth fibre. The albuminoids are the nitrogenous constituents of the plant. They are the most expensive, and the fodder that contains the largest amount is that which is worth the most. It is just the same in fertilisers. You know there are three special elements we have to return to the soil, viz., nitrogen, phosphoric acid and potash, and it is nitrogen which is the most costly of the three.

So it is with cattle foods. The nitrogenous portion is the most expensive. Examples of these albuminoids are the casein or curd in milk, the lean of meat and the white of egg. The fats or oils need no word of explanation—vegetable fats and butter are examples well known to you all. The chart shows us that fodder corn is not rich in fats, containing but three pounds per ton at the date of the first cutting, and five pounds on the second. The carbo-hydrates consist principally of starch and sugar. The fibre is the frame-work of the plant. By its vessels it carries the food throughout the tissues. As the plant ripens this becomes harder and more indigestible. The fats, carbo-hydrates and fibre, taken together, form the non-nitrogenous (for they contain no nitrogen) part of the fodder, and have for their functions the developing of heat and supplying of energy, in order that the animals may live and perform work. The albuminoids are largely used up in replacing the waste of the tissues. Reverting to our subject, we see in the matter of albuminoids there is no large increase in their amounts between the two dates; they are practically identical—26 pounds at the first and 27 at the second cutting. In the case of the carbo-hydrates, however, there is a remarkable increase—from 144 to 176—and in fibre from 77 to 90, so that on the whole there is a large increase of real cattle food per ton by allowing the corn to grow to maturity.

I now pass on to the experiments made in 1891 with corn fodder, in continuation of this work. We had under experiment four varieties: Longfellow, Pearce's Prolific, Thoroughbred White Flint and Red Cob Ensilage. Instead of choosing two dates for cutting, I took samples of the corns at different stages of development, viz., tasselling, silking, early milk, late milk and glazing. You may ask at what stages of growth were those samples cut in 1890? These varieties were not all alike as to their times of ripening—some were early and others were late corns. Consequently they were not all of the same stage of growth when they were taken for analysis. The corns on August 26th would be between silking and early milk, and on Sept. 9th between late milk and glazing.

As I have said, however, those experimented with last year (1891) were cut at the stages of tasselling, the early and late milk stages and the glazing stage.

Let us look, then, at this chart, prepared to show the composition of the fodder at these periods.

Composition of Corn Fodder (average of four varieties) at different stages of growth.

Stage of growth.	Water.	Dry matter.	Digestible matter in a ton.
	Per cent.	Per cent.	lb.
Tasselling	85.73	14.27	186.2
Silking	83.83	16.17	211.0
Early milk	80.34	19.26	256.5
Late milk	78.09	21.91	285.9
Glazing	74.01	25.99	339.2

The first work was to estimate the amount of water in these corns at the different periods. They were all analysed separately and the results averaged. In the tasselling stage we found 85.73 per cent. of water and 14.27 per cent. of dry matter. In the silking stage the water had decreased somewhat (83.83 per cent.), and a corresponding increase of the dry matter to 16.17. In the early milk stage there was 80.34 per cent of water and 19.26 per cent. of dry matter. In the late milk stage 78.09 per cent. water and 21.91 per cent. dry matter; and in the glazing condition 74.01 per cent. water and 25.99 per cent. dry matter. As the corn matured there was a steady and continuous increase of digestible matter. This is brought out in a very marked way by the third column of the table. We have there the number of pounds of digestible matter to the ton in these different stages. In the tasselling stage the number of pounds per ton was 186.2; in the silking stage, 211; in the early milk, 253.5; in the late milk, 285.9; in the glazing, 339.2. These experiments, then, fully corroborate the results of 1890, and they all point to the proper time at which the corn should be harvested.

Now, at the same time that we analysed these samples, we weighed the yield of an aliquot part of an acre in order to ascertain the total yield of fodder per acre. These corns were grown under the same conditions and consequently we have in the averages here given a means of comparing the yield at the different stages of development. The results are as follow:

Average of four varieties of Fodder Corn, 1891.

Stage of growth.	Weight per acre.		Digestible matter per acre.
	Tons.	lb.	lb.
Tasselling	22	1,329	4,220
Silking	24	52	5,069
Early milk	22	1,806	5,873
Late milk	21	759	6,012
Glazing	21	1,154	7,308

We notice first that the total weight per acre increases to the silking stage and afterwards decreases. The maximum weight is probably somewhere between the silking and early milk stages. It might therefore be said if there is the greatest weight at that period, why not cut the corn then? Well, the total weight does not represent the greatest amount of cattle food always—just in the same way that the greatest amount of milk does not always represent the greatest weight of butter-fat. The digestible matter increases to the last stage. Now, this decrease in total weight is chiefly due, undoubtedly, to the drying up of the Indian corn as it stands in the field. We have seen that in this glazing condition the corn fodder does not contain so much water as in the earlier stages, and undoubtedly this decrease per acre is due to the drying-out process. That of itself points to an economy in leaving corn on the field, supposing there were nothing else in favor of so doing, because it costs as much to carry a ton of water as a ton of anything else. But, at the same time, there is a gradual and steady increase in the amount of dry food notwithstanding this decrease in the amount of total yield per acre. In the third column of this table we have the amount of digestible matter per acre. I have already pointed out to you that there is a very large increase in weight of digestible matter—nearly 100 per cent.—as a consequence of allowing the corn to mature to the glazing stage, which proves that the decrease in the total weight per acre does not represent a loss in real cattle food. Let us see what the figures say. The weight of digestible matter at the tasselling stage is 4,220 lb. per acre, at the silking stage, 5,069; at the early milk stage, 5,873; at the late milk stage, 6,012; and at the glazing stage, 7,308—nearly double the amount of digestible matter per acre—all simply by allowing the corn to come to the glazing period of maturity.

These experiments of 1890-91 have settled pretty definitely—at all events in my mind—two facts. One is that we need not look for any great difference in the composition of the dry matter in the different varieties of Indian corn. Any one variety will produce fodder as rich as any other variety, provided that it comes to the same development. In other words, if we can raise on an acre as much dry matter from one variety as from another, I cannot tell you as a chemist which is the better of the two to grow. The value of the dry matter varies in one variety and another within such small limits that we can disregard the variations altogether. Secondly, that we must choose the corn that will yield the largest amount of dry matter per acre, and that will at the same time come to this proper stage of maturity before there is danger of frost. To recapitulate, we want to sow a large growing corn and one sufficiently early in maturing that it will reach the glazing stage before the frost comes.

These other two tables afford us a knowledge of the relative value of certain fodders. The analyses here given are results obtained at the Experimental Farm Laboratory. I wish to emphasise, in discussing these two charts, the relative value of fodder corn as a cattle food. I wish to convince you by corroborative evidence of its value and importance. I consider that the extensive growth of fodder corn has revolutionised and is now revolutionising the whole dairy industry. It has solved, to my mind, the question of winter dairying. It seems to me that that matter is no longer a mere possibility, but its ultimate success is assured, and I think I can give you figures to establish that statement as far as providing the cattle with palatable food at a very small cost is concerned. In this first table we have the

Composition of Fodders.

Fodders.	Water.	Dry matter.	Nutritive ratio.
	Percentage.	Percentage.	
Fodder corn—glazing	74.01	25.99	1 : 11.5
Carrots	90.47	9.53	1 : 10.5
Turnips	90.34	9.66	1 : 8
Mangel-wurzels	91.29	8.71	1 : 7.5
Sugar beets	84.24	15.76	1 : 9
Sugar beet pulp	95.72	4.28	1 : 7
Potatoes	78.00	22.00	1 : 6
Clover and hay (dry)	14.00	86.00	1 : 5.5
Fodder—oats (green)	81.00	19.00	1 : 7.2
Fodder—rye (in head)	71.28	24.72	1 : 8

In the first column we have the percentage of water in the different fodders, in the second the amount of dry matter, and in the third the nutritive value. Allow me to explain briefly the last term. Supposing in the dry matter of a certain fodder there were just twice the weight of carbohydrates as of albuminoids, its nutritive ratio would be 1 to 2—that is, the proportion of albuminoids to carbohydrates is as 1 to 2. Such would be a fodder in which the nitrogenous matter was particularly high. Consequently we say that the wider the ratio the lower in value the fodder, and the narrower the ratio the more nutritious the fodder. The nutritive ratio gives us a ready means of comparing the relative values of the dry matter in fodders. The dry matter in roots approximates closely in quality. They are all comparatively wide ratios and point to the necessity for the addition of grain in a fodder ration. I have inserted these ratios because the question has been brought up as to the value of the dry matter in fodder corn. They show us the relative value of the cattle food in corn fodder compared with the other fodders we are discussing here.

I now direct your attention to this last question of relative yield. These first yields per acre are obtained, in most instances, from the reports of the Bureau of Statistics of Ontario, and are the average yields in the province extending over the last nine

years. In the case of fodder corn no such result was obtainable, but I have put the average crop at 16 tons per acre, and I think you will agree with me that that represents the average crop the farmer obtains in this province.

Average yield of fodders, and amount of digestible matter per ton and per acre.

Fodder.	Average Ontario crop.			Average Experimental Farm crop.		
	Yield per acre.	Digestible matter.		Yield per acre.	Digestible matter.	
		Per ton.	Per acre.		Per ton.	Per acre.
	tons. lb.	lb.	lb.	tons. lb.	lb.	lb.
Fodder corn—glazing	16	339	5,424	21 1,154	339	7,308
Carrots	10 820	173	1,984	23 1,061	173	4,070
Turnips	11 1,460	179	2,066	27 745	179	4,846
Mangel-wurzels	12 1,620	145	2,231	36 531	145	5,258
Sugar-beet	10	296	2,960	23 82	296	6,820
Sugar-beet pulp	.....	83	.....	.....	83	.....
Potatoes	3 1,074	440	1,556	6 1,200	440	2,904
Clover and hay (dry)	1 800	1,034	1,448	1 1,520	1,034	1,820
Fodder oats (green)	.....	.....	.....	10	208	2,080
Fodder rye (in head)	.....	.....	.....	10	266	2,660

The first column give the average yield per acre of Ontario farms of the different crops. The second and third columns show us the digestible matter per ton and per acre. You will notice that there is a very large balance of digestible matter in favor of fodder corn, when cut at the glazing stage, over all the other fodders mentioned. Then we must consider the question from another aspect, that of cost of production. If it costs twice as much to grow an acre of corn as an acre of carrots, this tremendous difference in digestible matter in favor of corn would be largely off-set But it is just the other way. You will all agree with me that it costs more to raise one acre of roots than it does to raise one acre of fodder corn. Consequently there is a greater balance in favor of corn than is shown by these figures.

Now the three other columns of this table are given as the average results obtained upon the Experimental Farm at Ottawa during 1890. These yields per acre are averages. They are not figures derived from any single weighing. At the Experimental Farm we have raised crops more than double in weight of those the average Ontario farmer grows. How is this? Is it due to a better soil, a more favorable climate or improved culture? Our soil at Ottawa is only average in quality, our climate is not so favorable as that prevailing over the greater portion of the province. I think there is no reason why over the greater part of Ontario our average yields should not be reached. I have no doubt the farmers of Ontario, especially in this neighborhood, could get very much larger crops than they do at present. You will find in our reports the history and treatment of our soils and crops—the character of the soil and the nature and amount of fertiliser applied. Thus you can make yourself master of our conditions—for it is by no secret process that these yields are obtained. By the study of these reports, by a visit to the Experimental Farm and by putting into practise what we learn, I fell sure that many of us will be the better off. I have given you here the average of the true and actual weights obtained on the Farm. In the case of Indian corn, you see we obtained at least one-fourth more digestible matter than the average Ontario farmer. On the average we obtained 21 tons as against 16, and we must remember that it is in the excess over the average wherein the profit lies. It is just like keeping the cow over winter doing nothing—just alive, and expecting a large profit from her. It is the excess of 21 over 16 wherein the larger part of the profit is, and I think therefore it is well that we should ask ourselves if there is not something amiss when these averages of the Ontario farmer are so small. In the case

of mangels you see you had 12 tons per acre; we had over 36. We have more than double your yield of sugar beets, and these figures have been exceeded by us. In the case of potatoes we have double the yield; for fodder rye there are no figures of the Ontario yield which I could consult, but we have repeatedly raised ten tons to the acre.

In the last column is given the amount of digestible matter produced per acre on the Experimental Farm during 1890. Sugar-beets show closest approxmiation in the quantity of digestible matter to that in fodder corn.

The points I have endeavored to press upon you this morning are (1) the kind of corn to sow; (2) the time to harvest the fodder; (3) the value of fodder corn compared with other cattle foods, and (4) yield per acre of fodder corn obtainable compared with that of other farm crops.

Sow more corn and sow it properly, harvest it at the right time, and if possible, put it in a silo. More corn means more cattle, and more cattle means a greater fertility of our soil and an increased crop field.

A Voice.—How much corn do you plant to the acre?

Mr. Shutt.—We plant in rows three feet apart; three or four kernels to the foot, which averages from 18 lb. to 20 lb. to the acre. It may also be sown with good results in hills. Three feet six inches between the rows, will often give an equal yield per acre with rows three feet apart. Corn requires a great deal of sunlight for the development of the carbohydrates—the starch and sugar—and it cannot obtain this if the rows are too close. For the same reason it is no economy to over-seed. You will get a larger yield by following the directions I have given you than by growing it broadcast, as has been the custom heretofore. By this method there has been a tremendous loss of cattle food. The corn so planted will not come to proper maturity, the yield per acre will be less and in every way a poorer material will result. I might add a few words in regard to the means and methods of preserving the corn as ensilage. I have already pointed out that you do not carry so much water to the silo by allowing the corn to come to this stage of maturity, and then allowing it to wilt after cutting as you do when the fodder is cut earlier in the season. And not only that, but you get a better and sweeter silage by the water being absent. Corn containing 75 per cent. of water will make a very much better silage than a fodder containing 85 per cent. It is the presence of the water very largely which assists fermentation. Of course the great principle we must bear in mind and endeavor to put into practise in the preservation of silage is the exclusion of air. When we have means for thoroughly excluding the whole of the air, we have solved the problem of keeping the corn in a good condition. It should be thoroughly pressed down so that as little air as possible may be left in the silo; because it is the air which starts fermentation, and which causes the silage to unduly heat. The oxygen in the air causes decomposition—in this case really a burning up process—and the more air the greater will be the destruction of cattle food. If we had a perfectly air-tight silo there would be very little heating. I have at Ottawa ensilage in two air-tight bottles which has kept perfectly fresh for the past two years. These bottles, more than two years ago were filled and well pressed down, rendering the ensilage compact before sealing. That corn fodder is just as good and sweet to-day as when it was put in. It has never heated or fermented, simply because there was not sufficient air to cause fermentation. Fermentation means acid and acid means decay. We wish to prevent the development of acid; we want a sweet ensilage. Fermentation softens the tissues and then the weight of the superincumbent mass drives out the air from the cut corn, at the same time a large amount of the air between the corn stalks, is developing heat and acid. As soon, however, as that is used up fermentation stops.

A Voice.—Did you allow it to be in the field any time after cutting?

Mr. Shutt.—Yes. It is well to let it wilt for a couple of days or more. 74 per cent. of the corn at the glazing condition is water. Possibly two days wilting will reduce this to 65 per cent.

Mr. Hunter.—Did I understand you to say that water in cattle food had no value

Mr. SHUTT.—I said that in discussing this matter of the relative values of corn and other fodders we need not assign any value to it ; but water has a food value though not a monetary one, and I am not going to say anything to the contrary.

Mr. HUNTER.—Then, would we consider the sap in a plant in any different light from water drawn from a well or creek ?

Mr. SHUTT.—Yes, water assists in the digestibility of an article ; we all know the value of succulent foods for producing a large milk flow and for keeping the animal healthy. This is largely due to the water in the fodder, but nevertheless, although I admit that, in comparing corn with other fodders we should find it extremely difficult to give a pecuniary value to the water of a fodder.

Mr. HUNTER.—Well, let us turn to the turnips. I see their composition is 90.34 per cent. water and 9.66 per cent. dry matter. Now, am I to suppose that if I added this 90.34 per cent. by carrying water and giving it to the animals with dry matter amounting to 9.66 per cent., would it be equal to giving it in the food itself ? I know it has been said that feeding turnips to cattle is a very expensive way to water them. My own opinion is different.

Mr. SHUTT.—I should say it was a very foolish thing to say that water supplied in that way would make up for the deficiency of water in the food. Directly the succulency and the digestibility of a fodder is affected it becomes less valuable. That is quite true.

Mr. HUNTER.—Then, another point : Is there no difference in the feeding value of different families of mangels, carrots or turnips ?

Mr. SHUTT.—There is. I have the figures for several of these. The reason I have not got them here is that I did not want to tire you with many figures. We do not find much difference in the composition of the dry matter, but the percentages of water and dry matter vary in each variety of turnips, and similarly in carrots. I can give you the figures showing the relative value of different varieties of carrots, mangels and turnips. However, the difference between two or three or five varieties of carrots or mangels or turnips is not as great as between carrots and corn fodder or between carrots and clover hay.

Mr. HUNTER.—My object in asking this is that it would cost no more to supply the seed for an acre of the intermediate variety of turnips—and there would be no more labor—than for some of the larger varieties. Then if there is a choice I want to know it and be doing the best. Suppose there were a variety of carrots which contained a very much larger percentage of dry matter than some other variety, would it be better to use that ? I think we will find we get the greater total yield or weight from the more watery carrot. All I want to do is to point out that we must take the two factors into consideration.

Mr. SHUTT.—Some details of several varieties of the principal root crops will be found in our next annual report. In the matter of the corn plant, I think we have come to the conclusion that the variety which matured the earliest produced the most ears.

Mr. HUNTER.—I understood you to say that if you could thoroughly exclude the air from the silo there would be no heating. Well, to speak of something outside of the silo, my own opinion is that the heating or non-heating depends on something else. I can keep manure in my sheep or pig pen for a whole winter and add bedding at different times until I get almost three or four feet deep of manure. When I come to take it out I find there is no attempt at heating until I begin to get down. My own opinion is that it is pressure not the air, that is heating it. Is not that so ?

Mr. SHUTT.—No, it is not so. (Laughter). You cannot have heat without combustion, and that means the using up of the oxygen of the air. Without the presence of air, there can be no heating.

Mr. BISSELL.—Did you ever dry corn whole ?

Mr. SHUTT.—It is done. I do not think it likely you will get as good results from it as from ensilage.

Mr. BISSELL.—What length do you cut your corn ?

Mr. SHUTT.—About an inch this year. It makes no difference to one-half an inch

A Voice.—How do you cut the corn in the field?

Mr. Shutt.—By hand.

Another Voice.—Did you ever see such a thing as sweet ensilage?

Mr. Shutt.—No. I do not think testing it by an accurate and delicate test, by chemical analysis, I have seen ensilage that would not give a faint acid reaction. Still, leaving that out of the question, we all know the difference between sweet and sour ensilage. I maintain that if we could exclude the air entirely we could get perfectly sweet ensilage.

Another Voice.—There are several sections of the country where we have had ensilage with a bad smell and an acrid taste, and it has left our neighbors under the impression that we are "off," and that we are feeding what they call "sour kraut." I never saw sweet ensilage yet.

Mr. Shutt.—That must have been due to imperfect preservation; but when we have once realised the theory we have to put into practice we shall every year do better.

Another Voice.—I have had sweet ensilage, but this year it was sour.

Mr. Shutt.—Was the corn less ripe this year, and did you take the same care in putting it in the silo?

The same Voice.—It was cut at the same stage, and got just the same care as before.

Mr. Shutt.—I do not understand that. I may add that many of these results are contained in Bulletin No. 12 of the Central Experimental Farm. I have a number of copies here, and when they are exhausted, copies will be sent to you by writing to Ottawa.

Another Voice.—Is not the nutritive value about the same in clover hay as for corn fodder?

Mr. Shutt.—No; as I explained, corn fodder has a nutritive ratio of 1:11.5 and clover hay of 1:5.5, The narrower the ratio the more concentrated the fodder. Don't go away with the idea that corn is a complete food. It does not contain sufficient albuminoids to make it a complete ration. It must be fed in conjunction with something else. We must feed a certain quantity of some meal with it, which is richer in albuminoids. But you must have a bulky fodder in order that the whole digestive apparatus may be kept in a healthy condition, and I think I have given you enough figures to show that this corn fodder is the cheapest food to use for this purpose. I never maintained that it was a complete food in itself.

A Voice.—Would it be as nutritive to feed it dry?

Mr. Shutt.—I am inclined to think there is a certain amount of deterioration by that method of preservation. I think that the fibre becomes more and more indigestible as you dry the water out. Deterioration takes place in the silo and indigestibility increases in the dry fodder. That deterioration depends upon the amount of fermentation which takes place—which depends upon the relative exclusion of air. On the other hand there is the great probability of the dry fodder becoming more and more indigestible as time proceeds.

Mr. Hunter.—Do I understand that the less the degree of heat that develops, the better will be the quality of the corn?

Mr. Shutt.—Yes.

Mr. Hunter.—Does not heat, in cooking the corn, soften the fibre and render it more palatable?

Mr. Shutt.—Perhaps to some extent; my opinion is that our object should be to keep it in the condition in which it is put into the silo. The more fermentation you have the greater is the destruction in the feeding value of the product. I do not deny that the heating process softens the tissues.

Mr. Bissell.—When do you begin to feed after you have put into the silo.

Mr. Shutt.—Any time.

Mr. Row.—How would it be to feed rye straw alone?

Mr. Shutt.—I do not think it would be profitable feed.

Mr. Row.—Is there not a good deal of sugar in rye straw?

Mr. Shutt.—No, it is not so profitable nor so rich in quality as corn.

Mr. Row.—For horses I would as soon have a ton of rye straw as of hay.

A Voice.—You would not recommend it for a cow you wanted to give 50 lb. of milk a day?

Mr. Shutt.—I certainly would not. I do not think you would get much milk from such a diet.

MILK TESTING.

Prof. Robertson, Dairy Commissioner, was next introduced. He said: I am very glad to come again to Brockville to speak to the Ontario Creameries' Association. I am sorry I cannot use my usual form of address to you. I offer you my condolences. I have been accustomed in Brockville to be able to say, "*Ladies* and Gentlemen;" and I am sorry that you—the people in this vicinity—have not done everything you could to bring the ladies out to this Convention. I spoke last night in a city in Vermont, and a very large portion of the audience were ladies. One of the shrewdest speakers there said if they could turn the cows over to the care of the women of Vermont, they would get one-third more butter every year. The women of Ontario are concerned in the improvement of dairying. I had thought of speaking to you on cattle feeding this afternoon, but the hour is advanced, and I am billed to give you a long talk to-night. Your President has asked me to say a few things on the testing of milk, in order that you may understand how to pay for it according to its real value.

There has been a good deal of trouble over the whole province during recent years by reason of suspicions that have arisen concerning the honesty of dairymen who are patrons of co-operative factories. A very large number of prosecutions have been instituted because some men were suspected of taking something out of or putting something into the milk. As I came on the train this afternoon I sat for a long distance in a compartment where two inspectors for insurance companies were discussing their business. One said that at a point not more than a hundred miles from here, he had visited a "risk" that they carried, and the local agent said to him, "When you go back to the head office write and cancel the policy on that farm property; the occupant can hardly be trusted." In a short time the local agent wrote back "You can cancel that cancellation and leave the policy in force, as the suspected person has moved away." You see! The risk of damage to the farm property was not so much from accident, as from the moral or immoral quality of the man who occupied the premises. Now, this moral quality of the man in co-operative dairying, is an element you have to meet and provide for; and you can never fully meet that by any system of inspection, prosecution or fine. But if you can get down to a basis by which you will pay a patron of a factory precisely for what the milk is worth, you will eliminate the whole of the immoral desire that tends to adulterate the milk. A man will not keep so much cream for the coffee, or will not think it worth while to add water to his milk cans, if he be paid for their contents—milk, skimmed milk or water as the case may be. By this means you will prevent the man from being tempted to yield to doing a thing that is wrong, for the sake of the money he can make by it.

Let me give you an illustration. I go occasionally to the live stock markets. I see a steer that weighs 1,000 pounds brought there by one farmer—a steer of poor breeding and worse feeding—a steer of inferior quality, worth 3 cents a pound. I find another farmer with his beast, better bred and fed and housed, weighing the same, 1,000 pounds,

worth 5 cents a pound. One is worth $30 and the other $50, and there are 1,000 pounds weight in each. Do you suppose you would find the farmer owning the better animal prepared to say to the other: "We will divide the sum total of the value of the two and take $40 each?" I tell you, nay; and you will find the seller who got only $30 wondering why the other got $20 more than he, until he has a better beast next time. That would be the effect of payment for what the animal or milk is worth.

Now, in all our co-operative process of cheese-making and butter-making we can never hope to have durable satisfaction unless we have fair play. Everybody wants that, and everybody says he is going to get and give that. If you can merely show the farmers how to establish a basis of fair play, you will not find a single man who will offer any opposition publicly. I never knew a man mean enough to say he would not give his neighbor fair play. Sometimes sayings and doings do not quite agree.

Then we have had some suspicion aroused because the farmers have known they were not getting fair play, and a few men have become dissatisfied until the element of distrust has done more to hinder the progress of creameries and cheese factories than anything else. As soon as people get suspicious of one another, they lose all enthusiasm in and for their work. The practice of paying for the mil at the creameries by the pound, regardless of quality, does harm to both classes of patrons—harm to the one who sends rich milk because he does not get what his milk is worth, and more harm to the other man who sends the poor milk because he gets something for nothing. As soon as you find a man get that, he is deprived of the incentive to provide and do something better. If you furnish the man with that incentive he goes along producing the purest and best quality at the highest profit to himself.

Then I think you may take it for granted that the farmers of the whole Dominion are quite willing to adopt a basis for the payment of milk which shall be fair, if they are taught how to do it. All through my experience with farmers I have observed this: I have found a readiness to do what they believe to be right when they see how it can be done. There is more often a difficulty to see the right way, than a want of willingness to walk in it.

Now, for butter-making there can be no difficulty in paying for milk according to its real value, if you can discover precisely the percentage of butter fat which it contains. Butter is not all butter-fat, but five-sixths of all good butter is butter-fat. Then one-sixth more is added from other constituents of the milk. We may include the salt in this one-sixth. Now, if five pounds out of every six pounds are butter-fat, it follows that the more butter-fat the farmer furnishes, the more butter his milk will make, and the quantity it will make will vary according to the butter-fat in his milk. Now, this other one-sixth portion of butter is largely water. In some of the butter which I have just been examining at your exhibition here there has been more than a sixth of its weight of water, and that is one of the chief faults the butter in the adjoining room is characterised by, in the opinion of Mr. McKergow and myself. That defect is caused by creamerymen washing the butter in the churn during winter weather with water as cold as they would use during July. The temperature of the water in winter should not be below fifty-eight degrees. If you try to get at the value of the milk for butter-making by any other constituent than the butter-fat you will fail.

Let me give you a few figures I culled the day before yesterday in a large creamery I had the advantage of inspecting. I suppose many of you have heard of the St. Alban's Creamery, Vermont. They make some five tons of butter a day in the summer time. They have about 700 patrons. Now, here are the actual values of the milk at that creamery for June, July, August, September and October. I give you the lowest and highest each month, showing the variation in the butter value of milk per 100 pounds.

	Lowest.	Highest.
June	56 cents.	81 cents.
July	55 "	86 "
August	62 "	95 "
September	77 "	131 "
October	92 "	153 "

You will see that during October the milk from one man was worth 61 cents per hundred pounds more than the milk from some other man. The farmer, as soon as he finds he is paid for his milk according to its true quality, will keep better cows, more cows, and give them better care. I need not reason any more to show that this is the only fair basis upon which to carry on the co-operative creamery business. Now, the Babcock milk tester, invented by Dr. Babcock, of Wisconsin, provides a very simple, accurate and reliable method for determining the butter-fat in milk. My friend, Mr. Shutt, is here from the Central Experimental Farm, and he has done a good deal in the way of comparing its results with those of gravimetric chemical analysis. I would rather that Mr. Shutt should give you a statement himself of the conclusions he reached, after making those experiments, but for ordinary practice in the dairy I may point out to you a few things that have come to my knowledge as to the way of handling milk in testing by the easiest methods and to save labor. A test made once a week will not give a quite accurate indication of the average quality of that milk for the week. The milk will fluctuate in quality from day to day. It will not vary much from day to day in a herd, but a great deal in the individual cow. The only safe way is to have samples taken oftener than once a week. One of the best ways I have learned so far was described by ex-Governor Hoard at Cobourg. A sample is taken from each patron's milk every day to the quantity of one-third of the 17.5 c.c. required for a test. Then the full test is completed twice a week or every third day. It saves labor, and in that way you get a true test of the milk every day. I therefore recommend the method which they are pursuing in Wisconsin for economy, efficiency and reliability. Then, in the handling of these samples, the butter-maker can never be too careful to make sure that the pipette with which he measures the sample of milk is of the exact capacity. We have found some of the measuring pipettes not true as to the size. If there were two in the factory and the maker used one for one man's milk and the other for another's and they were not precisely alike, there would be a material difference in the result. They need to be of the same capacity exactly.

In the Babcock testers used in Ontario, I find some machines which are defective in regard to mechanical construction. Some are driven by a loose leather belt which occasionally slips, and then the whirler is not driven so fast; and the speed being lessened the separation of the fat will not be complete. So there is need for having such a machine as will enable you to be quite sure that the required number of revolutions have been given. I have no hesitation in saying that, in my opinion, a machine driven by cog wheels or similar gearing is better than one driven by the kind of friction that I have referred to.

In the handling of the samples, it is always advantageous to keep the bottles as hot as possible during the whirling, and until the percentage of fat is read in the neck of the bottle. Any cooling will interfere with the uniformity of the test. I have come across a man who thought he was quite right in measuring the quantity of fat in the neck of a bottle by a wooden scale which he had constructed. He had used a pair of calipers to measure the fat, and then put them on the scale and read the percentage of fat by its figures. The necks of some of the bottles are narrower than others, so you can never be too careful to read the percentage of fat on the scale marked on the neck of the bottle in which the sample was tested.

Before I resume my seat I would like to make this further observation: that as soon as this method of payment is adopted you will find a great improvement in the quality of the milk and a perceptible increase in the quantity of fat in the milk, which comes from good housing, good feeding, good care and good breeding. As soon as a man finds that he is paid for his milk according to its quality he will take more care to produce milk of the best quality; and that will stimulate him to produce more butter-fat of a superior quality. There are very few neighborhoods that will not respond to the pride of reputation, which comes from getting paid the highest price that is paid any other neighborhood for what they have to sell. I have not made that quite clear. I do not think that the people around Brockville would furnish quite so much milk to the cheese factories, if it were not that the Brockville cheese factories have an excellent reputation and the patrons of the factories feel proud of their good name and success. Now, if you can help the farmers to get the highest possible price per hundred pounds for their milk in a certain neighborhood, then

every man will have more pride in his business; and if one feeder will make more milk of a better quality than his neighbors, they will make a point of finding out how it is done. On the other hand, if any neighborhood supplies poor milk which is pooled with rich milk and paid for at the same price, you will find that milk of poor quality from scrub cows will continue to prevail. Wherever buyers of cattle give the same price for all animals, there you will find the poorest animals, because the farmers have no incentive to keep better ones. Make a distinction and discrimination in the quality and a difference in the price, and then the whole business will respond. Thus an enhanced price will be secured for the whole output. There are few people whose moral stamina is so robust that they can refrain from leaning towards the wrong when it pays to do wrong. If a man finds it pays to do wrong he may not clean fall over that way, but he will lean that way. If you make it pay in cash to do right you will help the man to lean that way.

Mr. Bissell.—Does the feeding make any difference in the value in the butter-fat?

Prof. Robertson.—Yes. A great many tests have been made to discover how quickly you can increase the percentage of fat by varying the food of the animal. As far as my own observation has gone I do not think it possible to increase the percentage very speedily by feeding. It depends more upon the constitutional temperament of the cows. However, we have put twenty-five cows in three groups at the Central Experimental Farm this winter to test this very point. One thing we know you can do by good feeding, you give every pound of fat in the milk a higher value always—a richer flavor and a better body.

Mr. Macfarlane.—In the neighborhood of Ottawa, a friend of mine tried to increase the yield of fat by feeding linseed meal. He brought his samples of milk to me and we tested them from day to day; but the increase was so small compared with the cost and trouble that he gave it up, especially when he found that the increasing of the oil-giving food had a bad effect on the digestion of the cow.

INSPECTOR'S REPORT.

Mr. Mark Sprague, the Inspector of the Association, presented his annual report as follows:

Mr. President and Gentlemen.—I now beg leave to submit my report for 1891. We had thirty-five creameries under supervision—twelve milk-gathering and twenty-three cream-gathering—scattered throughout Ontario. The daily average make at the time of my visits was about fifteen thousand pounds.

The season just past has been very satisfactory both to patrons and proprietors. Butter being in good demand was in many instances sold before it was manufactured, and shipped once a month to cold storage, and there held for export in September and October. We tested two thousand samples of milk. I had five persons punished for forgetting to send strippings to the creamery along with milk skimming, etc.

The trade for home consumption was very much increased, some creameries having disposed of their season's make in prints and small packages. The beginning of next season I think will see us with half a dozen new creameries starting, which must be gratifying to those who have given their means and energy in advancing and raising the standard of Ontario's butter.

But they must not tire, for there is much to do yet. We must have means whereby we can send butter fresh and new to our cousins across the Atlantic. This can be done by refrigerators on our steamers, and it no doubt will be when the trade demands it. "Necessity is the mother of invention."

It will be a banner day to cheese and butter factories when milk is paid for according to its butter-fat value. There then will be no desire to rinse the pails and pour the washings into the milk can, or to leave the cow before she has been milked dry and return to her with another vessel.

The desire of every patron then would be to send milk with as large a per cent. of butter-fat as his skill in breeding and feeding could obtain.

By way of example as to the present system: On August 14th there was delivered at a creamery not many miles from here milk which contained 4.8 per cent butter-fat and pooled lb. for lb. with milk that contained 2.8 per cent. fat. Now, 100 lb. of the 4.8 per cent., or former milk, would make 5.37 lb. or $5\frac{3}{8}$ lb. butter in round numbers, while 100 lb. of the 2.8 per cent., or latter milk, would make $3\frac{1}{10}$ lb. of butter. Had this milk been paid for by its fat value the owner of the good milk would have got pay for his skill in breeding and feeding. Milk such as described has been delivered to all our creameries. It is not confined to one section or creamery.

Our cream-gathering creameries need help given them by way of their patrons, as to the best mode of cream raising, that they may be able to get all available cream; also as to how to care for it so it will go to the creamery in the best possible condition to make fine butter.

CATTLE FEEDING.

Prof. ROBERTSON followed with a talk on "Cattle feeding." He said: I had no expectation of having to reappear before you so soon, but I find that two telegrams have arrived which imply that I have to leave by to-morrow morning's early train for Ottawa, and I want to say a few words to you on the feeding of dairy stock in stables.

There are few matters of greater interest to the man who keeps a creamery which I think it important for him to know, than the most economical way of feeding cattle. Instead of detaining you long by an elaborate explanation of the underlying principles of cattle feeding, I will try and concentrate your attention on a few of the main points of feeding dairy stock in stables. Most men who feed cattle take no pains to have any practical knowledge on the subject at their fingers' ends. I hardly ever meet a farmer who has given as much thoughtful attention to the feeding of his stock as he has to the shape of the mould board of his plow. I do not know any part of farm practice which has been followed with so much hap-hazard blindness as the feeding of cattle.

Now, food is any substance which nourishes the tissues of the body and at the same time furnishes energy to perform the functions of living. A horse wears off parts of his muscles by working. He expends energy by pulling loads, and must have something, to supply the waste which comes from efforts and movements. A cow does not require so much energy for labor, but she requires nourishment for the maintenance of her body, and substances for the formation of the product which she yields. So in feeding cows you have to feed materials not merely to supply the place of waste tissue, but to form a product having the same constituent elements in itself as the feed which is consumed. The body of a cow creates nothing. Nobody creates anything. We may change the appearance of things—we may alter the arrangement of things—we never create. We may expend only what we have before acquired. Now then, in feeding cattle economically a man has to use the kinds of food which are adequate to furnish energy—force—like the fuel in the furnace for the boiler of an engine. Some foods have in them a sufficiency of energy to keep the animal living, but the energy is difficult to get at—to get out by the animal. Another way of putting it: If you analyse a stick of cordwood quite green, you will find there as much substance and more than in the same stick of cordwood quite dry, and I think the green stick of cordwood would give you more energy through a steam engine than the dry one, but it would take more favorable conditions to get it to burn or in other words to get the energy out for definite use. You get a special service from the silo, which was discussed this afternoon, in that sense. If you can make the food palatable, you quicken all the energies of digestion. I went to a hotel last year in British Columbia, where the waiters were all Chinamen, and the table cloth seemed to have been sprinkled with coffee and soaked in gravy. All the appointments were in the same condition. The meat, I think, was wholesome, the potatoes seemed to be about as dry as usual and the bread was all right, yet I could stand only one meal and a half. My digestive organs refused to act after that. I think chemistry could have found more there than one could see. Do not forget in preparing food for cattle to make it of a flavor such as they will like. Talking of corn stalks, if you allow them to wilt for a day after cutting you will have a delicious aroma. You get that in corn by wilting and in hay by the curing process. I have not time to speak of the real value of ensilage beyond this: We have made a very careful calculation of the cost of the corn in our silo and we find it is about $1.40 a ton, after making allowance for the waste. I may say another thing, that in watching men cultivating corn I have found a very great tendency to drive the cultivator a good long way from the young and tender plant for fear that it will be destroyed. Then after the plant has become stronger they drive up close and rip the soil down deep, which is just contrary to the proper practice. Cultivation close to the plant when it is young will permit the admission of air and loosen up the soil so that the roots may find an easy opportunity of spreading. After the plant gets bigger, the side roots come out horizontally; and if you cut deep then, you cut off almost one-third of the plant's supply of root support. Don't be afraid to cultivate thoroughly when the plant is very young, but gradually draw off and draw up as it gets bigger. That will make a difference of several tons in the yield per acre.

One thing more, after you have provided good food of the best kind—every animal seems to have a constitutional limit for consuming food with economy and profit. Some animals have a capacity for using a great deal more than others, and of giving a better return for it. In some cases where I have fed beyond 7 lb. of grain per day per cow, the quantity and quality of the milk have been decreased and depreciated, respectively. When that result follows liberal feeding, we have gone beyond the capacity of that animal for economical digestion; when we go beyond that, it means both a waste of feed and injury to the animal. I find a great many men feeding animals more rich food than they can use to advantage. Now, rich food has a very small proportion of water in itself, and an animal must have a great deal of water in its system to use rich food to advantage. Under suitable conditions an animal will not drink enough water to enable it to use more than 6 or 7 lb. of grain per day to advantage, if it is fed plenty of dry fodder besides. Water performs a double service in the feeding of animals—it is a solvent to dissolve the food, and it is a vehicle to carry the dissolved food around the system. Now, every milking cow requires a large quantity of water, and you can give it to her best in the form of succulent food. If you have a cow with a large capacity and are giving her a large supply of grain food, make sure that you give her succulent food with it. I would like to say something now which I intended to have said earlier, that an animal seems to make a better use of its food when it gets salt every day. The action of salt on the digestive organs seems to be to promote their activity and make them more fit for their work. I made an experiment at Guelph and from several similar ones at other experimental stations, the evidence seems to be all along the same line—that the absence of salt will make milking cows give less milk and a poorer quality.

In our feeding experiments with milking cows, definite conclusions cannot be given yet, for the simple reason that the experiments will have to be continued longer and repeated in some parts, to establish any principle or reliable and instructive conclusions. With one lot of cows we commenced an experiment on a ration of corn ensilage and meal. The following is the ration: Corn ensilage, 60 lb.: wheat bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total 68 lb. Of that mixture each cow consumed on an average a fraction over 92 pounds per day. The cost per day was 19.37 cents per cow.

After a month's feeding of that ration we increased the ensilage to 90 pounds with the same quantity of meal. The ration as then arranged stood: Corn ensilage, 90 lb.; wheat bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total 98 lb. Of that mixture, each cow consumed on an average of 95 pounds per day. The cost per day was 15.77 cents per cow, or nearly 4 cents per cow less than in the former case. The reduction in the cost by increasing the proportion of bulky feed did not interfere in any way with the yield of milk. We have made a similar reduction in several cases, for the purpose, mainly, of illustrating that when farmers use an excess of meal in feeding milking cows they do not get any extra milk, or value in any other way. There is no appreciable gain in the weight of the animals consequent upon the heavier feeding of meal. I do not find many cows that can use to advantage more than 7 or 8 pounds of meal per day. At the same time I have had letters from many farmers in different parts of Canada, informing me that they are feeding from 14 to 17 pounds of meal per animal per day, and asking for an expression of opinion as to why their cattle did not thrive under such treatment.

In the case of three other cows, we commenced on a ration as follows: Corn ensilage, 30 lb.; hay, 15 lb.; bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 53 lb. Of that mixture, the cows consumed an average of 68 pounds each per day. The cost was 23.19 cents per day.

At the end of one month the quantities of ensilage and hay were increased, until the ration stood: Corn ensilage, 40 lb.; hay, 20 lb.; bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 68 lb. Of that mixture, the animals consumed an average of 53 pounds per day. The daily cost was 16.22 cents per head. In this class, as between the first and second periods of feeding, the cost per day was reduced nearly 7 cents per head, and there was no

appreciable falling off in the yield of milk. There was the natural lessening of quantity, which in the course of the month was equal to 1 pound 6 ounces of milk per cow per day.

With still another set of three cows of smaller size, the cost per day was reduced by increasing the proportion of bulky food in the ration. For the first month the ration stood: Corn ensilage, 60 lb.; bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 68 lb. Of this mixture, the cows consumed per day 74.5 pounds each. The value of the feed per day was 15.57 cents.

During the feeding period of the second month, an additional quantity of corn ensilage was added to the ration, after which it stood as follows: Corn ensilage, 90 lb.; bran, 2 lb.; chopped peas, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 98 lb. Of this mixture the cows consumed an average of 70.8 pounds each per day. The value of the same was 11.75 cents per day per cow.

We find, as a rule, in our feeding, that the milking cows seem to do better with some hay or straw along with the ensilage in the ration than upon corn ensilage and meal only. With a mixture of 60 pounds of corn ensilage and 8 pounds of meal we found that they ate 74.5 pounds per day per cow. (In every case we allowed them to eat all they would take.) With the other ration, wherein 90 pounds of ensilage were put (instead of 60) with 8 pounds of meal, they ate an average during the month of 70.8 pounds each.

In every one of the cases, when the ration of six different sets of cows was reduced in cost by the addition of bulky feed with the meal, we found that the animals consumed a less weight per day of the cheaper ration; and in no case was there any appreciable difference in the yield of milk that could be reckoned as due to that cause. The indication of the test is that the ordinary cows of from 900 to 1,200 pounds, cannot consume to advantage more than from 7 to 8 pounds of meal mixture per day, together with corn ensilage or hay or roots.

In the case of some larger cows—Holsteins and Shorthorns—weighing from 1,300 to 1,500 pounds, we had them fed three times a day (the other milking cows were all fed only twice a day) on a ration for the first month consisting of: Corn ensilage, 40 lb.; mangels, 30 lb.; bran, 2 lb.; chopped peas, 2 lb.; chopped barley, 2 lb.; oil cake, 2 cotton seed meal, 2 lb.; total 80 lb. Of that mixture they consumed an average of 134.6 pounds each per day. The cost of the feed was 34.99 cents per cow per day.

During the second month the ration stood: Corn ensilage, 100 lb.; mangels, 30 lb.; bran, 2 lb.; chopped peas, 2 lb.; chopped barley, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total 140 lb. Of that mixture they consumed during the month an average of 122.3 pounds per day. The cost of feed was 21.89 cents per cow per day. Again, that shows a less consumption of the cheaper and grosser mixture; and thereby the cost was reduced to the extent of nearly 12 cents per cow per day, and there was no appreciable lessening of their yield of milk. This was one of the cases where we had been feeding an excess of meal; and we had no loss in the yield of milk and no loss in the quality of the milk by reducing it.

In the case of the other three cows of the larger and heavier breeds we fed them on a ration consisting of: Hay, 20 lb.; mangels, 30 lb.; bran, 2 lb.; chopped peas, 2 lb.; chopped barley, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 60 lb. Of that mixture they consumed an average of 67.2 pounds per day, of which the value was 29.1 cents.

During the second month the quantity of hay in the ration was doubled, when it stood as follows: Hay, 40 lb.; mangels, 30 lb.; bran, 2 lb.; chopped peas, 2 lb.; chopped barley, 2 lb.; oil cake, 2 lb.; cotton seed meal, 2 lb.; total, 80 lb. Of that mixture they consumed an average of only 46.6 pounds per head per day, of which the value was 19.8 cents; that is, they ate of the cheaper mixture, containing less meal, 21 pounds less per day and gave but a slightly less quantity of milk.

In every case the teaching of the experiment is in this direction,—that by reducing the quantity of the expensive and concentrated feed down to 7 or 8 pounds of meal per day, we obtained as much milk per head, the animals were in as good health, and the cost

of feeding was very much lessened. When a large quantity of expensive feed is given, (exceeding the quantities I have mentioned of from 6 to 8 pounds per day for the ordinary cow), it will result in no more milk and no increase of live weight.

I have not put before the Convention the full details of the quantities of milk, etc.; but the trend of the evidence in tests extending over three months with six sets of three cows each, is all in the direction of favouring the cheaper mixture as a ration. We have some incidental information in connection with milk, etc., which will be pointed out fully in the annual report of the Dominion Experimental Farms.

I have not time this afternoon to speak on the economical feeding of calves, but my opinion from observation and experience is that more calves should be raised and can be raised in a better way than at present. My opinion is that we have been neglecting this matter too much; and that if in the future farmers will furnish cream to the creameries during the winter they can raise all their calves. Now, even in Ontario, there is a difficulty in finding good labor to milk the cows that are now kept. If the farmers would raise all the calves they could feed, they would have a great many steers, and by feeding steers they could apply their labor in such a way and at such seasons of the year that they could feed twice the number of cattle with the same number of helpers. I do think that if farmers would give the intelligent study to this business which it deserves they could keep four times as many cattle as they now have.

Mr. Tennant.—How large a silo will it take to ensilage enough to feed a cow for the winter?

Prof. Robertson.—About 50 cubic feet will hold a ton of ensilage, and about 5 tons of ensilage will be quite enough to keep a cow for a long winter.

Mr. Tennant.—Supposing you have 20 cows?

Prof. Robertson.—A silo large enough for 20 cows would be about 5,000 feet—30x 12 feet and 20 feet deep.

The Convention then adjourned.

EVENING SESSION.

The evening session was held in the Opera House, which was filled with an audience comprising not only members of the Association but a large number of the *elite* of Brockville, including a goodly representation of the fair sex. The addresses were interspersed with vocal and instrumental music, kindly furnished by local talent, which greatly enlivened the proceedings. President Derbyshire occupied the chair, and seated with him on the platform were Hon. John Dryden, Minister of Agriculture; Prof. Robertson and R. J. Graham, the speakers of the evening, besides many prominent dairymen from all sections of the province.

GOOD RESULTS OF ASSOCIATION WORK.

Mr. R. J. Graham was the first speaker called upon. He said: I may say with regard to the Convention I am well pleased to be here and well pleased to meet you in this thriving town, of which we have all heard so much from our worthy President, and to see such an interest taken in our Convention and such a turn-out this evening, especially of ladies. I may say since I have been connected with the Association we have never had such a large attendance, and I trust as our Association grows in years and prosperity we will continue to have the attendance of the public more and more. We would like to see a large attendance not only at the evening sessions, but at all the sessions, because it inspires and helps us. I may just say a word or two in regard to our work in connec-

tion with this Association. At the first Convention six years ago there were only some eight or ten of us present. Since that time we have been gaining ground gradually and steadily in the right direction. Our audiences have continued to grow larger, and the work has continued to be more and more appreciated. When we commenced six or seven years ago our butter was in very bad repute both at home and abroad. Not only have we improved the quality of creamery butter, but we have raised the standard of dairy butter. I know the farmers have taken copy of the creamery men, and to-day you will find dairy butter put up in sample packages similar to creamery butter. I may say with regard to the work in connection with our creameries that our creamery butter is much superior in quality to what it was six or seven years ago. I may say also that our instructor has been doing most efficient work. We have now on exhibition as fine a lot of creamery butter as has ever been gathered together in Ontario. Some of it is of very good keeping quality. The butter made in the first week of January is of very fine quality. I might add further that I trust that as we continue to progress we will raise our standard of butter so that the people all over Ontario will continue to give us their assistance, that the government will continue to give us their assistance, and that we will all push our great butter industry so that before long our butter will enjoy as great a reputation in the old country as the Danish butter does to-day.

OUR TRADE AT HOME AND ABROAD.

Hon. Mr. DRYDEN was received with applause. He said : I want first of all to take occasion to publicly thank the President for his kind words. He has always been very kind to me heretofore, and is continuing to be so now. It is said the best goods are done up in small parcels, but I think in his case we have an exception. (Laughter).

Now, Mr. President, I am not here to give instruction with reference to any of the subjects which have been or may be discussed at this Convention. I have no doubt that my proper place would be to sit at the feet of the President and other gentlemen here who all their lives have given their time and thought to those matters which have brought us together at this Convention. But I am here to assure you of the sympathy which the Ontario Government has in the development of the butter industry. I am here to say that we are willing to assist you in the good work that you have undertaken. (Applause.) I have no doubt at all that the development of our butter industry must always depend upon the people themselves. It must always depend upon the knowledge and enthusiasm and enterprise manifested by the people who are most intimately connected with it. You may send out teachers and inspectors to instruct, but unless the people themselves are willing to receive instruction and put it into practice, very little good can be accomplished. Now, I hold that the best way of inducing enthusiasm—the best way of developing enterprise—is to give the people information. If you can manage to instruct a man and convince him that by adopting a certain method he will increase his income, you have given him the best impetus I know of to induce him to manifest enterprise. Somebody must undertake to impart knowledge and instruction, and I maintain that this is one of the proper and legitimate functions of any government. We, in fact, adopt this idea in the whole school system of this country. We hold that is right to afford instruction to every boy so as to enable him to make a success of himself in the life which is before him. We adopt the same principle in the education imparted by our agricultural societies throughout the country. It is the same principle which has made us equip and carry on the Agricultural College at Guelph, and which has, I may say, induced us to give money and assistance to the dairy associations, the agricultural societies and the farmer's institutes. So in these various ways we are trying to give instruction, in order that the people may continue to prosper and improve in connection with the different callings which they are following in this country.

Now, I may say, as a farmer, I have reason to feel grateful for what has been done in this country in connection with agricultural improvement. There was a time when the Ontario Government had the field almost entirely to themselves. In these later years the Dominion Government are supplementing our efforts until we as agriculturists are having advantage of theory upon theory, line upon line, and precept upon precept; but I am bound to say that after all none of us will get too much information. We need all the instruction we can get to make the best of our calling. We have been in the habit of boasting with reference to what has been done in connection with the cheese industry in this country. We are proud of it; but I judge from reading the address of my friend, the president, that he will agree with me that there is a good deal yet to be done in this matter of dairying. We have gone forward until we have reached a certain stage; but if we mean to hold our place we cannot afford to stand still; we must still go forward. We must look out lest in the future we should lose the laurels we have gained, and other persons who are willing to bring the same intelligence to bear and to employ the same skill as we, should take our place in the market of Great Britain.

We believe in the great possibilities of this country. I am always proud of my country. I know we have a good soil, that we have a good climate for raising agricultural products, and a climate that is calculated to develop the very highest type of intelligent manhood as well. I know we can hold our own with any other country if we have the same opportunity. We do not want to take the second or third place; we want to stand at the top, and if we mean to hold the highest place, we must insist upon lessening the cost of production and improving the quality of our products.

I would like to call your attention to some tables I have here. These are figures which have been taken from the Trade and Navigation Returns of Great Britain, and to me they have been intensely interesting, and I am sure they will be equally interesting to a great many of you. First of all with reference to our cheese productions. These figures cover a period of ten years beginning with 1881 and ending with 1890. In 1881 we exported in round numbers about 49,250,000 pounds of cheese. We have gone on year after year increasing that quantity until in the year 1890 it has reached nearly double that amount—about 94,250,000. If we go to the United States we find just the opposite has taken place. In 1881 they exported about 148,000,000 pounds, but every year since they have been losing ground until in the year 1890 they only exported a very small quantity more than we exported from Canada—a little over 95,000,000 pounds. Now, how is that? The answer is that through the co-operative and educative system adopted in this country the quality of our cheese has continued to improve year by year while the quality of the American cheese has not advanced. At the present time the Americans are alive to this fact, and are endeavoring to adopt such means as will bring their product up to ours.

But let us look at the butter productions and we will find that we have gone in a reverse direction. In 1881 we exported to England 17,649,491 pounds of butter. We received at that time an average of about 20 cents per pound. Now year by year we have been sending less of our butter into that country until in 1890 there is a little less than 2,000,000 pounds—1,951,585 pounds. Turning to the United States we find that precisely the same thing has been going on. In 1881, they sent 91,560,000 pounds to Great Britain and the quantity has grown less and less until in 1890 it amounted to a little less than 29,000,000 lb. How does this come to pass? Has the market grown less and less? No; that is not the case at all. In Great Britain they still require 220,000,000 pounds a year, and they continue to receive that amount from one source and another. What is the matter then? It is just this, we have not improved the quality of our butter as we have improved the quality of our cheese. We have allowed this market to dwindle away by failing to keep pace with other countries in this regard. The result is that the importations of Great Britain have come from Germany, Denmark and France. Great Britain received 67,749 cwts. from Denmark in 1889, as compared with 22,634 cwts. from Canada. But that is not the worst of it. I find our butter is of such a quality that it only commanded from 17 to 18 cents while the Danish butter commands 24 cents; and none of the other countries received so low a price for their product as Canada did: Germany received 23 cents, Holland 22 cents, and France a little over 23

cents. So you see clearly we are behind in this matter of butter making. But through the co-operation of this Association, headed by such a man as its President, I hope we shall, as he said, be able to produce a quality that will eventually command the same price as the butter of Denmark. Now, remember, that this market is still open to us, but if we are to get these people to receive our butter, we must make the quality superior. I think these figures speak to us so clearly that we must all take heed of them. We must all realise that it is absolutely necessary to export a better quality than we have been doing.

Now what does that mean? It means better stock, better food, and better methods. I meet people every day who will not believe it makes any difference what kind of a cow you keep. They think a cow is a cow, and that is all there is to it. I know it makes a very great deal of difference. We must teach them that if they are to produce the best quality of butter they must have the best stock and supply the best food. You cannot get sugar out of a cedar tree, and you cannot get a good quality of butter out of a cow that gives a poor quality of milk. Neither can you feed a cow upon refuse and expect satisfactory results; it won't work. In reference to improving the quality of our stock, I learned a little when I was in England last summer. Some of you will remember I had undertaken to purchase some stock for our Ontario Agricultural College. I was at the farm of Mr. Coleman, who has a very large herd of Norfolk Polls, which somewhat resemble the Polled Angus, but are red in color. About 100 are kept by this gentleman for the production of milk alone, and I found that the men did not feed by guess. I found that they did not keep one cow and send away another by guess. The milkers were provided with a scale and a memorandum book with every cow's name, and they took the weight and marked the amount of milk of each cow day by day, and by means of this book were able to tell you the record of every one of the cows. They are studying these different things, and so they make their selection based on definite results and produce the best that can be produced. So you must realise the necessity of continuing to instruct. You won't get through all the work you want to do this year nor next year. You will always have to move forward, this year and next year, taking "Onward and upward" for your motto, if you would secure the first place.

Having said this much about the foreign market, I want to say a word or two about the home market. I heard a story up west about a gentleman who was examining a lot of butter of the very highest quality, and he came across one lot which was considerably inferior to the rest. When asked where he would send this, he at once said, "Oh, we will send this to Toronto; anything is good enough for the folks at home." I do not think that is fair, and what I want is that the instruction should go on until the time shall come when we shall have minimised the production of this inferior stuff—when the products of our cheese factories and butter factories shall be all of a superior quality, so that we cannot afford to let a pound stop at home without commanding the highest price and when the people will be educated to that degree that they must have the very best of it. It was with that view I had undertaken and equipped the Travelling Dairy, because while I believe the foreign trade must be done by the co-operative creameries in the country, yet I think the farmers should be taught at home to manufacture better butter than they have been manufacturing, and that they should be taught as to the care of animals, and as to feed and all the rest of it, and this work is all in the same line as you are doing, only it is perhaps bringing the instruction just a little nearer to the people. While I know some of you think I am not taking the right course, I believe that time will show you are mistaken and that I am right. I believe that the farmers will begin to see that if a better article can be produced at home they will realise a better price for it, and it will prepare them for the work of the creamery when the time comes for a more general introduction of the creamery system. One difficulty at a meeting of this kind is that you cannot get out the farmers whom you want most to reach. You will always find the best butter-makers here. They are always anxious to get any instruction which will enable them to make a still better article, but you cannot get the people out who make a poor article, but you will find that when we go among them, little by little these people will get instruction and put it into practice, and become a sort of advertising medium among others. I know some sections of the

country where the butter-making has been entirely revolutionised. We want to revolutionise the whole trade until a better product is produced generally. One way to bring this about would be to have those who are dealing in butter pay a better price for a good article than they would pay for an inferior one. The trouble is they will pay the same price for one sample as another, so long as it is called butter. Whether it is butter or grease it makes no difference. So long as that is done, so long will creameries be handicapped, and when we get the dealer to demand only the make of the best factories they will either drive the poorer ones to adopt better methods or drive them out of the field of production altogether. I do insist that a discriminating market is the best possible market we can have. Sometimes we complain because buyers weigh our grain and give us pay according to its quality. I think they have a perfect right to pay just what the grain is worth.

I believe in co-operation. I do not like the word "combine," but I do like "co-operation," and I believe that when men co-operate they can do more for themselves in this as in every other calling. We must help one another. A man who produces a superior article is apt to say, "If others have just as good a chance to make good butter as I have they will take away the market from me." No, they won't. If you will all make a superior article it will be more rapidly consumed, and you will have more demand for your product. Let our loyalty manifest itself in an earnest desire to put Canada in the first place in regard to the agricultural products which have brought us so much fame in the past, and depend upon it if we work together in harmony, the energy and zeal of our people will put our dairy products in such a place as will end in not only the betterment of our own people, but of the nations of the earth. (Applause).

THE ECONOMICAL PRODUCTION OF BUTTER.

Prof. ROBERTSON was received with applause. He said: I find that these conventions are very great helps to me in my work. I find that it would be impossible for me to do the work that is expected of me if I could not very often meet farmers in convention assembled, to discuss and learn from them their difficulties, as well as their successes. I think of the excellence of many of our farm products,—our horses and our sheep, our cattle and our swine, our cheese and our butter, our wheat and our barley, and all those many things which we have in super-excellence in this country; and then I go back through the materials and products, and processes, and back through all the agencies, to find the real original cause of excellence. I find it in somebody's clear thinking, and in some thinker who has solved some of the difficult problems of agriculture, and helped other men to use all the forces of nature for their service and good. Now, anyone who thinks towards expression in painting, in music, in sculpture, in business, in war, in farming, has to work through agencies and by means of instruments. When a man takes hold of any task in the world he requires some agent or agency, subordinate to and controllable by his thought, wherewith to effect any change for the better or the worse. And so if a speech or meeting will nourish the power of thought and make it stronger and brighter and better, the farmer—every man—will be helped thereby. So far as a convention helps a farmer to be a better thinker towards expression in work and words, so far is it of service to him. You may load a man with information until he is so tired that he will be nearly always tiresome to everybody else; but if you will help a man to think clearly, and then help him to think towards expression, he will bring thought to his work and do the world's work with head and hands. I have read somewhere a quotation from a very ancient author, written a long time before the birth of Christ, in which it is said "To labor, the gods give all good things." That is a truth which holds good to-day. Every man in laboring should have first a clear comprehension of the object he seeks to obtain. Up in the garret of my house I have a very barely equipped carpenter shop. I never *waste* any time there sharpening a chisel; I may *spend* some time in that way. I have heard a farmer say "Oh, I could not waste a

day in going to a convention!" As the rubbing on a hone sharpens my chisel, so friction of minds in a convention brightens thought and sharpens intellect. "As iron sharpeneth iron, so does the countenance of a man that of his friend," in friendly discussion of their common interests. The least serviceable of all tools is a dull mind and man. A plow does not create soil, neither does a cultivator: but these stir the soil up, and by stirring they make it more fertile. A man's mind becomes fertile in great deeds, from educational contact with his fellows. Otherwise, it lies fallow; and fallow fields give a great crop of weeds, but never a great crop of grain until stirred up and sown with good seed. I have put myself down to night to speak on a most matter-of-fact subject—the economical production of butter. To some of you it will seem rather tedious to have to endure such a subject when you came for fun. I find that a great many men think butter-making to be a dreary, dreary, dreary, dirty occupation—I mean the men who do the hard work of the farms. Let me show you the reason for dreariness of life on some farms. The farmer lacks information; he works in a wrong way, and works hard; he lacks confidence in his fellow-farmers and becomes suspicious; he stays isolated and fails to reap the advantages of co-operation and mutual exchange of opinions and knowledge; he finds it hard to make a living and make ends meet; and he listens to the harangues of the discontented, who tell him that everybody's hand, head and heart are against him. Then he goeth about in his mind seeking someone to devour, instead of building up his own fortunes and happiness and those of others, by turning his thoughts towards construction and production,—the economical production of butter. If a man has enthusiasm in his tasks he will find them easier and more remunerative; and, if I could inspire any man or any boy with enthusiasm and confidence in the capabilities of his own business, and give him a chance and desire to spend his best powers with advantage to himself, he would have new hope in himself and for his country. Where you find a man who is enthusiastic, you will seldom find a grumbler. I never heard a man enthusiastic about his business who complained about it. He is too busy trying to remedy the defects and improve its opportunities to waste his time or strength complaining. I think the butter-makers who are always complaining and blaming something lying outside of the environments of their own business for their failures, might very well improve the dairy industry by going to the land flowing with milk and honey. Such men would be ashamed to live, if they were not afraid to die.

There is nothing sordid in economy. The economical production of anything is the result of the application of the best skill to its manufacture. Men sometimes sneer at economy, because they think it has an element of meanness in it. I know men so mean that they will clasp both hands over two cents, and grip them so hard and continuously that their fingers will be too numb to scatter the seed in springtime to get a good crop for harvest. There must first be a giving out, a liberal sowing, before there can be an abundant harvest for reaping with joy. It is economical to sow bountifully when the seed and the soil are good.

Now, in the production of butter it is always economical to recognise that economy takes cognisance of a man's environment. We can grow oranges in Canada; we have an orange tree bearing oranges to-day in Ottawa, but it is in a conservatory. We cannot grow oranges economically in this climate. Many men try to go on doing something regardless of the natural conditions that they find around them. Now, we have in Ontaro the conditions for an economical production of butter. We have first of all a fertile soil—a soil rich in all the elements of plant food. We have a soil which gives the largest crops of forage plants in the world, with conditions to support all animal life in robust health. We have a capable people needing occupation—needing employment. Why should a man, living in Ontario, want to go off to Manitoba, or elsewhere, to get more room to spread himself on a great big farm? The money today is being made on small farms by men who farm well, and not by men who spread themselves over great areas and farm poorly. We have markets calling out for fine butter all the time; and making butter will enable farmers to keep their land in good condition, and give them and their families profitable employment. It is economy for the Governments, for the people, to do all they can to extend the economical production of butter.

I need only stay a moment to say this, that the changing condition of the markets, require that a man should use his judgment, so as to meet these changes with an article that will meet the preferences of consumers. We are not responsible for having brought about many or any of the changes in the markets of the world, and their competitions. I can go back very well and recall when the sending of two large baskets of butter to the village store-keeper, affected the price, perhaps a penny a pound ; and now we find within a few miles of that same spot, butter from New Zealand, from Ontario, from France, and from Denmark, all converging to and competing in the one market We did not make the change, but the improvement and enlargement in the carrying facilities of the world, have made competitors of producers and countries far apart. These things have reduced the influence of the individual producer on the market to a very minimum. Therefore, it is a time for serious lamentation—for clothing ourselves in sackcloth and ashes, and blaming everybody but ourselves ! But while we cannot control the marketing end of our business, which has been taken from us by the progress of civilisation, the other end of it has become more and more within our jurisdiction and control. Better methods and more knowledge, have made it possible for us to reduce the cost of everything we sell ; and, if we can control the cost, we can control the profit better than before. So it will always pay to give special attention to the home-end of the business in the economical manufacturing of butter.

To do this requires the study of a few things. The people of the United States never did Canada so much small service as when they enacted the McKinley Bill, and put an almost prohibitory duty on hay. Farmers in the Province of Quebec this year, have to go over to the neighbouring counties to buy cows, and through their produce of butter and cheese, they will get more than they could have got by the sale of the primitive and raw material. The following table shows the comparative exhaustion of the fertility of soil by the sale of one ton each of the different products which it enumerates :

Nitrogen, Phosphoric Acid and Potash in one ton each.

Article.	Nitrogen	Phosphoric acid.	Potash.
	lb.	lb.	lb.
Wheat	41.6	15.8	10.4
Barley	32	15.4	9
Oats	38.4	12.4	8.8
Peas	70.6	17.2	19.6
Beans	81.6	23.8	26.2
Indian Corn	32	11.8	7.4
Hay	31	8.2	26.4
Clover	39.4	11.2	36.8
Potatoes	6.8	3.2	11.4
Fat Cattle (alive)	50	31.2	2.8
Fat Sheep (alive)	44	22.6	2.8
Fat swine (alive)	34.8	14.6	2
Cheese	90	23	5
Milk	10.2	3.4	3
Fine Butter	.5	0	0

It pays to concentrate the products of the soil, and sell the refined products that carry the highest value with the least exhaustion of fertility. It is a fact that in one ton of hay you will sell 85 times more from the soil than you will in one ton of fine butter, and you will get for the hay probably $10 and for the butter $450.

Then, in the economical production of butter, it will always pay a farmer to remember that butter is merely a kind of food whereby a man obtains energy for work. If I move my arm I rub off some of the material of my muscles—the friction has worn some off. I need something in my food to repair the waste of tissues in my body ; besides, I need a supply of energy that will make it possible for me to originate and continue

motions and perform the functions of living. There is nothing in fuel that will repair the waste of the cylinder of an engine; but without the fuel you could not get the motion. What does that mean? You get all energy in all food and fuel from the old sun. He streams his rays down on the earth and on and into the plants, which the soil carries. He rolls his strength up into plants, as I might wind my strength into the spring of my watch. A plant may then become food and fuel. It is economical practice on the part of the farmer, to elect for his fields the plants which can serve him best in that capacity. The sun can store more of his energy during a single season's growth into the corn plant than into any other plant that grows easily in Canada. A cornstalk furnishes to the cows more energy than any other plant. Then you get this energy transmuted into butter, and you have "materialised sunshine," energy to supply force for your work. There is economy in that method of getting the sun to serve you by means of cornstalks, cows and butter. For this reason I think that every man who helps to make a farmer have increased faith in the value of cornstalks does a service to his country. The wealth of the Western States has come practically from two sources—from the sun and from the minerals;—from the sun through the cornstalks, which in various forms of derivative diet, has furnished the energy to dig up the minerals. You need not try to "bamboozle" yourselves into thinking that wealth comes into existence without somebody's effort.

Then, in the production of excellent butter, the farmer needs to have good cows. I have a great deal of respect for a good cow. I have a good deal more respect for some of the cows in my stable than I have for some men. If you will treat a cow properly, she will give back an equivalent for what she gets. She is, therefore, honest and will pay for her way through life. I will hunt with a microscope in the careers of some men, to see what they have given to the world of valuable service, and cannot find it. A cow sometimes does get more than she gives. I would not spare that cow. Put her on the block; get your money out of her in that way. You think of cows as boarders, kept for the profit of the man who keeps the boarding-house. Did you ever think of a man keeping a boarding-house, running on the general satisfaction plan, saying that if he does not get enough from one boarder to pay for his keep, he will get it from the others? No! he expects to make a profit on each one of them. The farmer should act in that way towards the cows. There is advantage from watching the cows and selecting the best of them. It is not so very hard to do, and most cows are capable of paying for their board in full, if they are given a fair chance. But, if they are brought up the wrong way, they are sure to go astray,—just like boys.

Some people have a preference for a large cow. To my mind, if I wanted a cow to consume more food than she will give a return for, I would like an immense animal. If I wanted her to pay for her board, I would just as soon have a small one. I believe I would rather have a small cow than a large one, if she will give the same quantity and value in her milk. Then, there is a notion that the bigger the cow, the better the quality of her milk. It is not so. I have faith in the quality of goods done up in small packages. I want to tell you what selection has done. The Hon. Thos. Ballantyne,—a man who has done more to advance the dairying interests of Western Ontario than any single individual I know,—spoke lately in my hearing, and he stated that one cow in his herd last year, gave 12,000 pounds of milk; another gave 11,000 pounds in the season. They furnished milk for cheese-making during the summer and for butter through the winter. It is possible for a farmer, by judicious selection and feeding, to enlarge the capacity of the cows in his herd. Mr. George Allan, who lives near Ottawa, is an excellent farmer He had four cows in 1888, which gave only 78 pounds of butter each. He began to grow cornstalks, and feed these with a little bran; and in 1889 they gave 131 pounds each; and in 1890 his cows gave him 204½ pounds of butter each. See the enlargement of capacity, and therefore the economical production. It is possible to enlarge the capacity of the cow and thus reduce the cost of production. That belongs to economy, and the wise man is economical always, because to be otherwise is to waste; and waste is worse than folly.

Economy in the production of butter, involves doing something during the long winter season. I know very few men who get all they want to get by working five

months in the year. Most of us have to work twelve months of the year. I would have my cow work as long as I have to work myself. If you make a heifer with her first calf, milk ten months, you create the tendency in her to keep that up, and in a short time you will have established a habit which will be transmitted to the progeny. I will find you herds of cows where they do not go dry at all. You may take these few facts away with you, that if the cow begins the milking season in the fall of the year, instead of the spring, she will soon give 30 per cent. more milk within the twelve months; she will give you milk during the winter, when it is worth on an average, fifty per cent. more money; (and by the closest kind of calculation, it does not require more than 25 per cent. more food to keep her milking than dry, if kept in proper condition in both cases); it will make it possible to keep a larger number of cows on the same farms. Cows milking through the winter, will provide a great deal of skim milk, for the raising of better calves, which means richer fields and more prosperity all around.

I have a great deal of faith in the capabilities of winter dairying in creameries to furnish means wherewith to banish almost every economic evil of which the farmers complain. I have no faith in this practice, or any other practice, to bring economic salvation, except by the action of the farmers themselves. I have no faith in their industry being propped up. I have faith in their building it up, together with the prosperity of this country, and thus working out their own betterment of circumstances.

Sometimes people say to me, "If everybody went into this industry of winter dairying, where would the profit come from?" Well, a great many people who do not want to do what is right, excuse themselves by thinking that they would strive to enter by the strait gate and walk in the narrow way, but they are afraid of making a crowd and keeping somebody out. You will never find any way to real success but the narrow way. The best way is always the narrow way, I do not care what line you are trying to follow up; and, because it is narrow, it will never be crowded,—not because of lack of room at the gate to get in, but because of lack of heart and courage, and continuity of purpose and effort. Then, in the economical production of butter, it will always be advantageous, to produce only the best.

I have spoken quite long enough on the economical production of butter from the farmers' standpoint without saying a single word about the manufacturing process. However, I will say a few words about that now. It is never economical to produce poor butter. A pound of butter which will not fetch more than 11 cents has cost somebody just as much as a pound of butter which will sell for 25 cents. It is always economical to help the cow to produce a large quantity of butter-fat in her milk; because five-sixths of the butter is fat, and one-sixth water and curd. Now, you will not forget that the elaboration of milk by the cow is a most mysterious and exhausting process. It means exhaustion of the nervous force. If you have a cow that is abused, kept out in the cold, ill-fed and uncomfortable, she will give you less butter-fat invariably, than one that gets better attention. In butter making it pays always to be a gentlemen. Our folks in Canada are getting to "size a man up" by the clothes he wears. That is a poor plan to discover a man's gentleness or greatness. I believe in the meaning of the word in dairying and elsewhere,—a man who is gentle and tender and strong. Now, if you will be harsh and cruel with the cows, you are no *gentleman;* and you will get only a rough man's pay from them.

Then, after the milk is made by the cow, it is always economical to have the best process provided to get the butter-fat out of the milk. After the milk is set, if left at rest, its globules of fat which are held in suspension, easily rise to the top. Stillness and coolness are two conditions required. Because many of the patrons of cheese factories use the cheese factory cans for setting milk in, after the factory closes, so as to get a large share of the cream for butter making, I have had some tests made to discover their suitability for that purpose. I have found the loss from deep setting in common factory milk cans to be six per cent. greater, than when the milk was set in ordinary shot-gun cans. Then, I set the milk at temperatures from 98 degrees down to 78 degrees, putting the cans in ice water, and found no appreciable difference when milk was set immediately after milking. I have set the milk immediately after milking and one hour later, and

have not been able to avoid losing 11 per cent. additional of the butter fat by the delay of one hour in setting. The slowness of a man is contagious—it affects the fat globules in his milk. Then, we have set the milk for periods of 11 and 22 hours respectively; and in the 11 hours' setting, there was an additional loss of 8 per cent. We have added water at different temperatures, from 160 degrees down to 60 degrees. I have found no appreciable difference from putting water in the milk in deep-setting pails. Then, in setting tests with cows at different periods of lactation—nine, six and two months,—we found by the use of the deep setting pails, we recovered only about two-thirds of the butter-fat. For four days we set the milk pails in water at 38 degrees, with the milk, when set, at a temperature of 78 degrees: and the loss from milk of cows that had calved nine months, was 28 per cent.; from that of those that had calved six months, 26 per cent.; and from those which had calved two months, 13 per cent. of the butter-fat unrecovered. For four days the milk was re-heated to 98 degrees, and set in water at 38 degrees; the loss from the milk of cows which had calved nine months, being 34 per cent.; from the milk of those that had calved six months, 24 per cent.; and from that of cows which had two months, 12 per cent. of unrecovered butter-fat. These are the average losses in deep-setting pails. Now, in shallow pans, we obtained better results from the milk of cows calved more than six months, than by any other method of setting. Many farmers say, that by the whirling process of a centrifugal cream separator, you cannot get all the butter out. If a cow has calved more than six months, by the use of the centrifugal machine you will get over 25 per cent. more butter from the milk, than by the ordinary deep-setting method. If she has not calved over two or three months, you will get about 10 or 12 per cent. more butter.

Then, we have been trying the effect of heating milk, to try and remove that offensive odor which is caused by the feeding of turnips. When we heated the new milk to 150 degrees, we have not been able to quite eliminate the odor. Then we have heated the cream to 150 degrees. A few years ago it was thought that if you heated the cream above 90 degrees you would burst the globules of fat and spoil the butter. That is not the case, and by heating the sweet cream to 150 degrees, we have quite eliminated all the odor of turnips. The butter seems to keep better, and we got one pound of butter from one pound less of milk than we got by not heating the cream. A common complaint that comes to us by mail, is that "the butter won't come." Well, the butter will come, if the cream be churned at a proper temperature. I have put the limit of time for churning at thirty-five or forty minutes. I heat the cream just high enough to make the butter come after about thirty-five minutes of agitation.

I find some people complain that there are specks in the butter. If you allow the vessel containing the cream, to be exposed to the action of the atmosphere a part of its moisture will evaporate, and a scum or skin will be formed on the top of the cream. That will be broken up by the churning, and you will have merely small portions of thickened dried cream in your butter. Prevention is better than an attempt at cure. Let the cream vessel be covered, or by frequent stirring prevent the formation of the skin of dried cream. The straining of the cream into the churn is also a good measure for keeping specks of thickened cream or curd from finding their way into the butter.

Occasionally, butter makers find the butter full of streaks. That condition may come from the retention of portions of the butter-milk in the mass of the butter. The addition of a quart of water for every two gallons of cream, after the granules of butter begin to appear and before the churning is completed, will help to bring about a speedy and full separation of the butter-milk. When the butter-milk has been removed the granular butter should be washed with cold water. In summer the temperature of the water should be about 55 degrees, and in winter about 60 degrees. For the washing, the churn should be revolved a half faster than for the churning. A streaky condition of the butter, sometimes results from an imperfect mixture of the salt with the butter. Re-working after the salt is dissolved, will correct that. Fine-grained salt only should be used. The presence of the salt should be perceptible to the taste, but not to the sense of touch. Attention to these few points, which I have mentioned, will assist you to produce butter economically; and, if the butter be produced under the direction of

skilful men in creameries, the labor will be very much reduced, and the profits of every farmer may be increased. At Woodstock and Mount Elgin, we have turned the cheese factories into creameries for the winter months, and the farmers there find it a profitable business to send their milk to the factory for butter-making during the fall and winter. I think in Ontario, next fall, you will find at least twenty-five cheese factories running as butter factories for the winter. Thus, you will have a more economical production of milk and butter and cheese.

I have to ask you to believe that these little helps and points of information which you derive from these conventions, do not constitute the sum total of the good which they do. The far-reaching influence of any movement for good is seldom recognised at its beginnings. When the sun shines, the blades of grass, which immediately spring up, do not comprise all his beneficence. Soil is warmed, seeds are germinated, the water for showers is lifted up, and a thousand gladnesses and goodnesses are quickened into being, although at the moment unseen. When the wind whistles through the trees in autumn, many more leaves are loosened than those which let go at once. So, if only a few prejudices and ignorances yield at first to the truth, let us keep on working for the improvement and enlightment of the farmer's mind, for the economical production of butter and the gaining of every economic and material good, which the heart of man can honestly and honorably desire. (Applause.)

The evening's proceedings closed by the audience singing the National Anthem.

THIRD DAY—MORNING SESSION.

The Convention resumed at 9.30 this morning in the Court House, the President in the chair.

PRIZE LIST.

The first business was the presentation of the prize list of the first butter show held under the auspices of the Association in connection with this Convention which was read by the Secretary, as follows:

Class I.

Aaron Wenger, Ayton, 1st prize	90 points	$20 00
Banford & Johnston, Hainsville, 2nd prize	85 "	15 00
J. H. Croil, Aultsville, 3rd prize	83 "	10 00
Jas. Struthers, Owen Sound, 4th prize	64 "	5 00

Class II.

E. G. Kuntz, Formosa, 1st prize	86 points	$20 00
J. H. Croil, Aultsville, 2nd prize	85 "	15 00
Frank Henry, Whitechurch, 3rd prize	84 "	10 00
Banford & Johnston, Hainsville, 4th prize	83 "	5 00
Aaron Wenger, Ayton, 5th prize	81½ "	3 00

Class III.

C. Johnson & Son, Athens, 1st prize	97½ points	$20 00
Banford & Johnston, Hainsville, 2nd prize	92⅓ "	15 00
E. G. Kuntz, Formosa, 3rd prize	91½ "	10 00
Frank Henry, Whitechurch, 4th prize	89½ "	5 00
J. H. Croil, Aultsville, 5th prize	85½ "	3 00

Class IV.

C. Johnson & Son, Athens, 1st prize	92 points	$20 00
Arch. Wark, Wanstead, 2nd prize	89 "	15 00
Samuel Hunter, Rockton, 3rd prize	88 "	10 00
E. G. Kuntz, Formosa, 4th prize	86½ "	5 00
Jas. Struthers, Owen Sound, 5th prize	83½ "	3 00

Class V.

Sweepstakes Gold Medal, C. Johnston & Son.

ELECTION OF OFFICERS.

Mr. Hannah next presented the report of the Nominating Committee, which, on motion of himself, seconded by Mr. Philp, was adopted, as follows :

We, the Nominating Committee, appointed to nominate the officers of the Ontario Creameries' Association for the year, 1892, beg leave to report as follows :

President, D. Derbyshire ; 1st Vice-President, Aaron Wenger ; 2nd Vice-President, John S. Pearce. Directors : No. 1, John Croil ; No. 2, A. C. Burgess ; No. 3, T. J. Miller ; No. 4, John Sprague ; No. 5, Robert Philp ; No. 6, M. Moyer ; No. 7, J. T. Brill ; No. 8, W. G. Walton ; No. 9, John Hannah ; No. 10, James Struthers ; No. 11, T. Brown ; No. 12, Arch. Wark ; No. 13, J. N. Zinkann.

Mr. DERBYSHIRE.—I may say it was somewhat unexpected on my part to be elected President again. I was rather expecting that Mr. Wenger, the 1st vice-president, would have an opportunity of taking the presidency this year, but it seems to be the unanimous wish that I should accept again, and of course that being the case I would not like to refuse the position. I feel it to be a great honor to be President of this Association. I feel that the position of President of this Association has attached to it probably more responsibility than that of any similar association in the country, because we know the butter industry does not hold the place it ought to hold. It is a comparatively easy thing to take the position of presidency of an association, such as the dairymen's, or cheesemakers', whose industry stands at the head of all the industries of this country. Our object should be to make our business stand next to that of the cheesemakers', and if we can we will beat them. That is the idea that prevails in the business just now.

THE BABCOCK TEST AND HOW TO WORK IT.

Mr. SHUTT was next called upon, and delivered an instructive address upon the same lines as that given at the Eastern Dairymen's Convention at Cobourg, a report of which will be found in the proceedings of that gathering. During the delivery of the address the speaker had a number of questions put to him, among others the following :

A VOICE.—Does it make any difference to the test at what temperature you have the milk to start with ?

Mr. SHUTT.—No. As I have said, the acid being very much heavier than the milk, falls to the bottom. On mixing, the whole changes first to purple, then to brown and finally becomes black.

A VOICE.—How long do you whirl the bottle in your hand that way to mix them up before putting the bottle into the machine ?

Mr. SHUTT.—Only a few moments, just long enough to thoroughly mix them. It is important that they should be thoroughly mixed. If they are not you have a certain amount of curd left in the acid which troubles you in the reading.

A VOICE.—Does the shaking require to be done immediately ?

Mr. SHUTT.—Fill up all the bottles with your samples and then do it.

A VOICE.—How would it do to inject a little jet of steam under the cover ?

Mr. SHUTT.—I think it would work very well, but I have not tried it.

Mr. BISSELL.—Would it spoil the test if you did not use the exact quantity of acid ?

Mr. SHUTT.—It is not necessary that you should measure the acid with a great deal of accuracy. If it has the right strength you will find no great difficulty though adding a centime or two more than Prof. Babcock recommends.

A VOICE.—Suppose a man had 60 samples to do in a day how long would it take ?

Mr. SHUTT.—Perhaps from two to three hours.

The SAME VOICE.—Well, we have 60 patrons at our factory. It would take all the maker's time to test their samples.

Mr. SHUTT.—I am of the opinion that the testing may be done three times a week or perhaps twice. If you can test 50 samples in 2 hours you are doing pretty good work. But although you have 60 patrons it is not necessary that the operation of testing their milk should be gone through every day. That is to say, that though you must sample every day it is not necessary that these should be tested every day. For instance, we take a sample to-day, a second to-morrow, and a third the next day, and then test them all altogether.

A VOICE.—Then you would have to keep your milk in a very cool place?

Mr. SHUTT.—No. I do not think you would have any difficulty in working the test if it had not been kept very cool.

The SAME VOICE.—Would you add potash?

Mr. SHUTT.—Potash will keep it. Where you use potash you should use a larger supply of acid afterwards. I wish to say here that we are making further experiments with the Babcock test in the matter of composite samples. If we are successful, it will only be necessary to make the test once or perhaps twice a week. This is important as saving much time, and I hope you will be in possession of the results and work on this question before long. Now, with every machine sent out you have full and explicit instructions, and by following them out faithfully you will not fail to get accurate results.

Mr. HUNTER.—If you use chloride of mercury in the samples can you not keep your milk?

Mr. SHUTT.—Yes, if you use corrosive sublimate you can keep your milk for any length of time. Borax is another preservative.

Mr. MACFARLANE.—Do you not think that to introduce mercury chloride is a dangerous thing?

Mr. SHUTT.—It is a dangerous thing, and, as I said with reference to sulphuric acid, keep it out of the reach of the ignorant or vicious. I do not advise you to use it, but it has been used for this purpose by some in the United States.

A VOICE.—Would it do to sample the milk every other day?

Mr. SHUTT.—No, I think not. A sample of each day's milk should be taken.

The SAME VOICE.—Well, you are almost admitting that we cannot use the machine in cheese factories.

Mr. STRONG.—Can we save up two or three days' milk at the beginning of the week and test at the end of the week?

Mr. SHUTT.—Yes, I believe so, but I hope to be able to give you my own experience with composite tests very soon.

Mr. PEARCE.—With regard to a bottle for the cream, you can get a bottle to work in any machine by blowing a bulb on its neck, graded above to read the fat.

Mr. MCPHERSON.—Would it not do to dilute the cream with water previous to the test?

Mr. SHUTT.—Yes. If you add water you must note the amount of dilution and be sure it is well mixed.

Mr. WALTON.—There are machines in which the bottles have larger necks.

A VOICE.—Can we always get the right strength of acid?

Mr. SHUTT.—There is sometimes a difficulty in getting the acid of proper strength. That is about 1.82 or 1.83 specific gravity. This would contain about 90 per cent. of sulphuric acid. If your acid is too strong you will find it creates a froth in the neck of the bottle and chars the fat. You will then have trouble in reading the fat from the presence of the curd in the fat.

A VOICE.—How can you tell the strength of the acid?

Mr. SHUTT.—You can tell by a trial with milk, and also by an instrument for that purpose that I brought here to show you and which has unfortunately been broken on its way down from Ottawa. If the acid is over 1.82 or 1.83 it is too strong to work satisfactorily. We have found, however, that by allowing stronger acid to remain below the milk in the bottle for a length of time varying from 10 to 30 minutes before shaking or mixing them together it would become diluted by absorbing water from the milk, and we get as good results as from acid of the proper strength.

Mr. HUNTER.—Is sulphuric acid not rather dangerous to use when mixed with water?

Mr. SHUTT.—There is a danger in mixing sulphuric acid with water. It always requires care.

Mr. HUNTER.—Is there any danger of samples having the same quantity of fat registering a difference owing to the strength of the acid varying from 3 to 4 per cent?

Mr. SHUTT.—No, I think not; but it is better to have the acid at standard strength. The test is reliable if you get your bottles and pipettes from a factory which will guarantee their accuracy.

Prof. DEAN.—I may say you can test the bottles. Take a sample of milk and test it in one after another, and if it registers the same in all they are all right. If you find one of them differing from the rest discard it.

Mr. MACPHERSON.—I am sure we have all listened with a great deal of satisfaction and profit to the address that has just been delivered. This question is before the dairymen. It is not only agitating the manufacturers, but the dairymen themselves, and I am sure when they come to understand it more thoroughly it will be more generally adopted. In considering the matter and looking to the future I see that perhaps there are two practical objections which the dairymen might have to its general introduction. In the first place some dairymen might consider the cost of the machine an objection. This I think is one of small account and that the price, considering the simplicity and convenience of the machines, places them within the reach of all dairymen. But the other objection is as to the cost of the material which we use in making the tests. The cost of the acid, I find, has quite a considerable influence in the factory. Taking the whole season through, in a factory where you have 100 patrons, with two tests a week, when we compare the demand with the cost it would be very small indeed. I would like to see a remedy in the cost of this material. Perhaps there is no way of reducing the cost of the machine, yet we see there seems to be a reduction in the price of the acid in the United States of 200 per cent. as compared with Canada. We find right across the lines it is sold at 1 cent a lb. and here at 3 cents. I am sure this is a reduction in cost of testing that is obtainable—that can be obtained by legislation. I do not know whether there is a Committee on Legislation, but if there is I hope they will bring in a motion in that direction.

The PRESIDENT.—We have a committee of that kind.

Mr. MACPHERSON.—If you have I am sure a strong motion ought to be brought in. I would beg leave to suggest that they should make a motion that such legislation ought to be asked by the dairymen as would secure a reduction in the cost of the acid.

Mr. MACFARLANE.—I am very glad indeed to hear that there is no other objection to the introduction of the Babcock test than those just enumerated. The gentleman who has just spoken seems to make no objection to the cost of the apparatus, but he has very strongly objected to the very high cost of the acid at the present time in Canada. Now, I am very certain that if dairymen here were to use sulphuric acid in large quantities they would get it just as cheaply as in the United States. They are at present buying in small quantities and paying the druggists a good profit. I know of one place where it is being manufactured—at Sherbrooke, and there it can be bought as cheaply as on the other side. I know they will supply you at one cent a pound if you buy in quantities.

Mr. PEARCE.—Speaking in regard to the cost of the machine, I am figuring to have them made as cheaply as possible in Canada. With regard to the acid, it is just as Mr. Macfarlane has said. I have been handling that acid this summer, and we have not got it down to the bottom price; but you must remember that it has to be put up securely and the cost of transportation is very high; but when large quantities are wanted the thing will come down to a very nominal cost.

Mr. MACPHERSON.—That is a point which I am glad the dairymen of this country will have the advantage of; but if there can be any objection to or increase of cost in consequence of legislation, let us have that removed by legislation. I feel satisfied, of course, that the suggestion brought out is quite true, but the question is whether even under those conditions legislation may not be effective in reducing the price of those materials, and if it can be let the dairymen act through the proper channels to obtain that remedy.

Mr. MACFARLANE.—I do not think legislation could have anything to do with it. There is at the present moment a great deal more sulphuric acid manufactured in Canada than can be used.

Mr. MACPHERSON.—Is there not a high protection on sulphuric acid to-day?

Mr. MACFARLANE.—I do not think it is necessary at a meeting like this to go into a discussion of the merits of free trade and protection. I think it is very unprofitable to occupy the time of the dairymen with such a discussion.

Mr. MACPHERSON.—I do not wish to bring that matter up. What I wish to point out is that if by legislation the dairymen of this country find that the cost is increased it is an injury, and if by adopting a resolution we can remedy that we want to do it.

The PRESIDENT.—If we find it is in the interest of the Dominion and of the dairymen to get legislation we are going to get it.

REPORT OF COMMITTEE ON DAIRY UTENSILS.

Mr. J. MILLER read this report, which was adopted on motion of himself, seconded by Mr. Carmichael:

Having examined the milk can and aerator exhibited by Chown, Howell & Co., of Belleville, would say we think it well adapted for the purpose intended and much superior to the ordinary style of milk can.

The machine exhibited by Messrs. Derbyshire & Co., of Brockville, for the testing of milk by the Babcock system we think fills the bill in every particular.

Of cream separators we found two, the Victoria exhibited by W. J. Cluff, of Brockville, and the Alexandria exhibited by John S. Pearce & Co., of London, Ont. After testing the skim milk we found both machines made a thorough separation of the cream from the milk.

THE WORLD'S FAIR.

Moved by Mr. WARK, seconded by Mr. HUNTER, that our dairy industry in this Dominion having reached such large proportions and our dairy products taking the lead everywhere: Resolved, that we call the attention of the Minister of Agriculture to the advisability of instructing the Dairy Commissioner of the Dominion to see that a proper exhibit of our butter and cheese be made at the Columbian Exposition or World's Fair in 1893.—Carried.

THE DAIRY INDUSTRY IN ONTARIO.

Prof. DEAN then gave the following address: The subject I am going to talk about for a few minutes this morning is dairying in Ontario. I want to show you one or two reasons why farmers should adopt it more generally than they do. The farmer should keep before him this question. Will it pay me to sell the raw material or to manufacture it on the farm? Who is the man that is making money at farming in Ontario to-day? Is it the man who raises the material and sells it that gets rich? No; it is the man who manufactures the material. Now, why should not farmers do the manufacturing? How can farmers become manufacturers? By turning their field produce into beef, butter and cheese.

The next point I wish to speak of is that in connection with the exporting of material from the farm. There should be this principle kept before the farmer: that he should sell articles which have a high value according to their weight, and which consist of carbon rather than nitrogen, potash and phosphoric acid. We make a great deal more cheese than we can eat, and accordingly we have to find a market outside of our own country. Now there is one thing that enters into this question. That is the cost of transportation. If you raise sheep, or beef or butter or cheese you will have to pay for the transportation. If you are going to ship $33 worth of wheat and $200 worth of cheese and $400 worth of butter, the freight will cost about the same on each. That is an important consideration. The sources of plant food are in the soil and air, and if we can sell those articles that come largely from the air we are producing an article that does not cost us very much. In the growth of plants there are three elements which are largely drawn from the soil, namely, nitrogen, phosphoric acid and potash, and when a farm becomes impoverished these are largely the articles taken out. In a calculation of the value of commercial fertilisers you will find nitrogen worth about 15 cents a pound. If you bought phosphoric acid you would have to pay about 6 cents a pound and for potash 5 cents a pound. Well now, every pound of plant food you market takes away a certain amount of plant food from the soil, or it takes away a certain amount of wealth out of the bank, which you may call your farm. Now, you know if you are drawing continually from a bank and not putting anything in your credit will soon be gone. The same thing will apply to the farm. When you sell thirty bushels of wheat at $1 a bushel you have sold about $6.25 worth of plant food. How do I know that? The chemist analyses the constituents of the crop and finds that there are so many pounds of the three elements I spoke of. Then I apply the scale of prices, and I find that there is about $6.25 worth of plant food sold from the farm along with every thirty bushels of wheat. In forty bushels of barley, applying the same scale, you will have $6.70 worth of plant food. In forty-five bushels of oats you will sell about $6.83 worth of plant food. Does it pay, then, to sell the raw material? You have robbed your soil, and unless you put back what you have taken away you will deprive the soil of its fertility.

In six thousand pounds of milk there are $6.42 worth of plant food. If that is the case, you are ready to say that dairying is no better than grain growing. To produce that six thousand pounds of milk you have had to feed a certain amount of food. Now, 80 per cent. of the food you feed is returned again to the farm in the shape of solid and liquid excrements, and that is how dairy farming is kept up, by increasing the fertility of the soil. Now, if you sold off 240 pounds of that butter, and kept the skim milk, you would only have sold five cents worth of plant food. So there is no system of farming I know of that will keep up the fertility of the soil like butter-making.

Now, in 1,000 pounds of beef there would be $4.54 worth of plant food, and in 1,000 pounds of live hogs about $3.10 worth of plant food. Well what advantage has dairy farming over grain-growing? Just this. In grain-growing the plant food is all taken from the farm. Manure made by animals running around the straw stack is not worth much more than the cost of hauling it out. The most valuable manure is made where good feed is given to the animals.

AUDITORS' REPORT.

Mr. James Bissell read this report as follows :

We, the auditors, appointed to audit the books of the Ontario Creameries' Association at this convention beg leave to report as follows, viz. :

Receipts.

Balance on hand as per last audit	$765 25
Members' fees	88 00
Government grant proceeds	1,498 25
Entry fees	6 75
Advertisements in Dairy pamphlets	40 00
Received from Instructor for fines, etc	16 00
	$2,414 25

Expenditures.

Instructor's salary and expense accounts	$689 65
Directors, board and executive meetings	267 10
Printing and advertising, including pamphlets	295 28
Secretary-Treasurer's salary and expense account	133 50
Premiums at butter exhibitions	309 00
Reporting Convention at Berlin	70 00
Expenses at Brockville *re* Convention	40 00
Judge's fee (travelling expenses)	5 00
Balance on hand	604 72
	$2,414 25

The report was adopted.

RESOLUTIONS OF CONDOLENCE.

Moved by Mr. Hannah, seconded by Mr. Millar, Parkhill : Resolved, that we deeply regret the death of Mr. Ira Morgan, a former Director of this Association, one who always worked for best interest of agriculture, and we extend our sympathy to Mrs. Morgan in her sad bereavement ; and that a copy of this resolution be sent to her by our Secretary. Carried.

Moved by Mr. A. Wenger, seconded by R. J. Graham, Resolved, that we deeply regret the severe illness of Mr. Sprague, a Director of this Association, and trust he may be speedily restored to health, and render us the assistance that his matured judgment and ripe experience has always brought to bear on all subjects coming before us ; and the Secretary send a copy of this resolution to Mr. Sprague. Carried.

A VOTE OF THANKS.

Moved by Mr. Croil, of Aultsville, seconded by Mr. Walton, of Hamilton : Resolved, that we thank the County Council of Leeds and Grenville for the use of this Court House, the Town Council for the use of the Opera House, the railways for reduced fares, the speakers for the splendid addresses, and the press for advertising and reporting the proceedings of this Convention so thoroughly. Carried.

GOVERNMENT AID FOR THE PURCHASE OF SEPARATORS.

Moved by Mr. Walton, seconded by Mr. Mark Sprague : That this Association appoint a committee, composed of Prof. Robertson, President Derbyshire, Mr. Moyer and the mover and seconder, to investigate and find out the best and cheapest made small hand and power separator, ask for tenders to build same, at some place in this province, in lots of 1,000 at a time, and to sell one to each dairy farm having five or more cows at cost price for manufacturing by adding $2 to $4 on each separator to cover interest, inspecting of all machines before leaving the manufacturer, etc., say, about $30 to $35 each, making, say, Guelph College the distributing point for those separators, to be paid for cash with order, or six months secured paper ; and that this Association ask the Government to advance a sufficient amount of money to satisfy the manufacturer until those machines can be sold and paid for.

The discussion on the foregoing motion was very brief. In the turn which it took the motion was lost sight of or forgotten, and it was not adopted.

Some one enquired whether the intention was to ask the Government to buy a supply outright, and if it was the opinion that farmers patronising cream gathering factories would supply themselves with these machines.

Mr. Walton.—The trouble is the cost of the machines. If the farmers could buy them at half the cost they are buying to-day there would likely be more of them in use. If

you take a herd of fifteen to eighteen cows they should give 300 pounds of milk per day for 200 days, making 60,000 pounds of milk. By the setting method on the farm it would take 30 pounds of this milk to make a pound of butter, or you would get, say, 2,000 pounds of butter for the season. With a separator it would take 25 pounds of milk to make a pound of butter, making a gain of 400 pounds in the season. If in each case you realised 20 cents per pound there would be a net gain of $80 for the season from using the separator—perhaps it would reach $100. If so, in a herd of eight or nine cows the separator would make a difference of $50, and so on in proportion. So that a separator would pay for itself, even with a very small dairy, the very first year. I might mention that these small hand separators can be fitted with a pulley on a crank shaft, so as to be run by power or hand, and that the most simple of the powers is a gravity tread power, which can be worked by horse, cow, bull or any of the farm animals.

Mr. Howard Bissell.—The topic of course is butter making. It is all right, and I agree with the idea of running our dairies through the winter and making butter; but what I understood from the President's address was that butter making was the most paying business in this country. Well now, in this part of the country our dairying consists principally of the manufacture of cheese. There is one of your directors, however, Mr. Miller, of South Grenville, I think, who has done both cheese and butter making, and I would like to ask him which has paid his patrons best. If they can make more money out of butter by the centrifugal system than they can out of cheese-making, then I believe in going into it. In this section of the country we have had this season the best price for butter we have had for years. Now, Mr. Miller has been making both, and I would like to know which pays the best through the summer. I think both sides of the question of the manufacture of milk should be discussed here.

The President.—One thing which Prof. Dean showed was that the constituents of butter took less out of the soil than cheese. What we want to do is to get creameries which are already established in this part of the country to make a finer quality and larger quantity of butter, and we are going to do it, and we are going to establish new creameries and put this business on a paying basis.

Mr. Everts, of the Eastern Dairymen's Association, said: I can assure you that I am very happy to have the privilege of addressing the dairymen—creamery men and cheesemen—here to-day. I expected there would be a general discussion on the cheese question as well as the butter question. Now, so far as the remarks of the President are concerned on running a combination factory—there are very few places that you can get the patrons close enough together to manufacture butter; but I want the dairymen and farmers here to-day to make no mistake at all about the cost of putting a separator in the factory. Why don't they say it will cost so much additional to put in an engine and boiler, and that altogether the cost will not be less than $400? Gentlemen, by the introduction of this system our cheese trade would be taken away from its place of honor among the nations of the earth, and its epitaph would be written. It won't be two years if you put separators in your cheese factories to make butter in winter. The English exporter will say "They are going to make butter and we are going to have some skimmed cheese very soon." I tell you it would not be four years until you had ruined the grandest industry the farmers have—especially in this Brockville section. I am prepared to help any man who is running a creamery who will run it from the time it opens in the spring until it closes in the winter. We can place our cheese factories in the position that we can manufacture just as early in the spring and just as late in the fall as you can manufacture butter, and there are $2 more to the ton in it for the farmers. I am opposed to sticking them together. If we can find men to buy butter we can find plenty of men to buy fine cheese just as well. I claim the farmers are being misled in this business. Take the point of the dairy cow. We have been educated for years to breed a fine dairy cow. What do we pay for a steer? They want the farmers to raise all their calves. If the farmers will only feed the cows they have and stable them properly, they will be doing the grandest work they ever did. You may take this road back to Westport, 46 miles, and you will find 200 cattle that would make fine butchers' meat in Montreal. Between Brockville and Perth you will find over 400 more. One man has taken over 200 of the finest two-year old heifers to Montreal this year.

Mr. GRAHAM.—At what price?

Mr. EVERTTS.—I don't want anything better next year than to furnish 2,000 fine two-year-old heifers to the Montreal market at a fair price.

Mr. GRAHAM.—What was the price?

Mr. EVERTTS.—$20.

Mr. GRAHAM.—Can the farmers afford to care for them and feed them to sell at that price?

Mr. EVERTTS.—Well, if they cannot, they cannot afford to raise steers and cows. There is plenty of room in this province for creameries, but I want you to show me how we can compete in the British market with the American people with their refrigerator cars and superior facilities for shipping from New York? Why is it that we are selling at 106 to 112 shillings, and Danish butter at 144? Then, if I were going into the creamery business in winter to do this testing I would buy the finest machinery that could be got in Canada or the United States, and if we did this you would see if it would bring us back the price. We have got our place for cheese and we are going to hold it. We are not going to allow any separator to take it from us.

Mr. WM. GRAHAM said: I began at cheesemaking and saw it was not paying, and then began making butter and selling it at 25 cents a pound.

Mr. R. J. GRAHAM (to Mr. Evertts).—What did you pay your patrons for milk this year? What did they get per hundred for their milk?

Mr. EVERTTS.—Mr. Graham, I understand, gets a big price for home consumption. My cheese take their place in the open market. I have yet to find a creamery where they sell their butter to the general trade of Europe—to the whole world—that paid as high a price this year as cheese factories did.

Mr. R. J. GRAHAM.—I did not come here to blow my own horn. It was not my own factory that I had reference to. I will name a man here who sells to the open market and guarantee that his patrons got as much for their milk as you paid for your milk.

Mr. WENGER.—I am running a good route from the cheese factories back to my creamery.

Mr. MACPHERSON.—I have a cheese factory, and I tell you I encourage butter-making. We must have butter in this country, and we must have cheese, and we must have them of fine quality; and so long as you do not get down to a mixture and build butter factories through our cheese factories we want to help you with the butter industry. We want to encourage butter where there is no cheese, and cheese where there is no butter, and use every means to make the very best article and the largest quantity of it possible.

The Convention then adjourned.

APPENDIX.

AN ACT TO PROVIDE AGAINST FRAUDS IN THE SUPPLYING OF MILK TO CHEESE OR BUTTER MANUFACTORIES, AS AMENDED BY 55 VICT.

Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. No person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager thereof, to be manufactured, milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk," without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory, that the milk so sold, supplied or brought to be manufactured has been so diluted with water, or adulterated, or had the cream so taken from it, or become milk commonly known as "skimmed milk," as the case may be.

2. No person who, in the course of his business, sells, supplies, brings or sends to any cheese or butter manufactory, or the owner or manager thereof, to be manufactured, the milk of cows, shall in the course of such dealing and business, keep back any part of the milk known as "strippings" without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory, of his having so kept back such "strippings."

3. No person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager thereof, to be manufactured, any milk that is tainted, or partly sour, without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory of such milk being tainted or partly sour.

The said sections 1, 2 and 3, shall not apply where the person charged with the offence proves to the satisfaction of the justice or justices of the peace that the dilution or adulteration of the milk, or the keeping back of the strippings, was without his knowledge or privity, and contrary to his wish and intention; and that he was not aware of the dilution, adulteration or keeping back as aforesaid at the time or before so selling, supplying, bringing or sending the milk as in the said sections mentioned; or (as the case may be) was not aware at the time of or before the selling, supplying, bringing or sending the milk that the same was tainted or partly sour.

4. Any person who, by himself, or by his servant or agent, violates any of the provisions of the preceding sections of this Act, upon conviction thereof before any justice or justices of the peace, shall forfeit and pay a sum of not less than $5 nor more than $50, together with the costs of prosecution, in the discretion of such justice or justices, and in default of payment of such penalty and costs, shall be liable to be committed to the common gaol of the county, with hard labor, for any period not exceeding six months, unless the said penalty and the costs of enforcing same be sooner paid.

5. It shall be lawful for the owner or manager of a cheese or butter manufactory to require the owner or custodian of any cow or cows whose milk is being bought for or supplied or sent to the manufactory, to submit such cow or cows at his farm, or other premises where such cows are usually kept, to such milk test, by persons named by such owner or manager, as may be necessary for the said persons to ascertain the quantity and quality of the milk of such cow or cows, on any day, and at such time on any such day as may be appointed by said owner or manager, and in case the owner or custodian of the cows refuses to so submit them, or obstructs in the execution thereof the persons engaged in mak-

ing the milk test, or interrupts, the test, or interferes in any way with the test, or the application of its result, he shall, on complaint before any justice or justices of the peace, forfeit and pay for every such offence a sum of not less than $10 nor more than $100, in the discretion of the justice or justices of the peace who may hear such complaint, together with the costs of the prosecution, if so ordered, and in default of payment of such penalty and costs, shall be liable to be committed by such convicting justice or justices of the peace, to the common gaol of the county, with hard labor, for any period not exceeding six months, or until said penalty and the costs of enforcing same be sooner paid.

6. It shall be lawful for the owner or manager of any cheese or butter manufactory who suspects any person of selling, supplying, sending or bringing milk to the manufactory, of any offence under this Act, to enter upon or to appoint some person or persons to enter upon, and such appointed person may enter upon the premises of the suspected person, with or without notice, and take samples of milk from the cow or cows from which the supposed offender was or had been immediately before then procuring the milk or part of the milk so sold, supplied, sent or brought as aforesaid, and any such suspected person who obstructs or refuses to permit the taking of any such sample shall, on conviction thereof, be liable to a penalty of not less than $10 nor more than $50, with costs of the prosecution, and in default of payment thereof, shall be liable to be imprisoned in the common gaol of the county in which the offence has been committed for a period not exceeding three months with hard labor.

7. For the purpose of establishing the guilt of any person under the first three sections of this Act, it shall be sufficient *prima facie* evidence to show that such person, by himself, his servant, or agent, sold, supplied, sent or brought, to be manufactured, to any cheese or butter manufactory, milk substantially below the standard of that actually drawn, or by the accused represented as having been drawn from the same cow or cows within the then previous or subsequent week, provided the comparison or test is made by means of a lactometer and cream gauge, or by some other adequate means of making the comparison.

7*a*. In any complaint made or laid under the first three sections of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause or mode of deterioration, and such description shall be a sufficient description of the offence to sustain a conviction, and in any complaint, information or conviction under this Act the matter complained of may be declared, and shall be held to have arisen within the meaning of The Summary Convictions Act at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere.

8. Any pecuniary penalty under this Act shall, when recovered, be payable one-half to the informant or complainant, and the other one-half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interests in and profits thereof, and all provisions of The Summary Convictions Act shall, so far as applicable, apply.

FOURTH ANNUAL REPORT

OF THE

INSPECTORS OF FACTORIES

FOR THE

PROVINCE OF ONTARIO

1891

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

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1892.

FOURTH ANNUAL REPORT

OF THE

INSPECTORS OF FACTORIES.

To His Honor the Lieutenant-Governor of Ontario:

The undersigned has the honor to transmit herewith the reports of the Inspectors of Factories for the year ending 31st December, 1891.

Very respectfully submitted,

JOHN DRYDEN,
Minister of Agriculture.

FOURTH ANNUAL REPORTS

OF THE

INSPECTORS OF FACTORIES.

WESTERN DISTRICT.

To the Honorable the Minister of Agriculture :

SIR :—I have the honor to submit the following Report of Factories' Inspection in the Western District of the Province for the year 1891.

During the year now closing, in the pursuance of my duties, I have gone the usual rounds over the greater part of my district ; and am pleased to be able to report that I have been in all cases cordially received by employers, who, with very rare exceptions, show every disposition to conform to the requirements of the Factories' Act, so long as no great outlay of money is involved in making the changes necessary to accomplish that object. There are some changes required to be made that do involve a considerable outlay of money, some to the extent of several hundreds of dollars, such as fire-escapes, and fans for the removal of dust, fumes, foul air and other impurities. There is a great difference in the way in which orders are complied with ; for instance, I had occasion to order three fire-escapes to be erected on one cotton factory, which was done willingly and promptly. On the other hand, at another factory a fire escape was ordered, costing about $200, and it was not put up till after considerable delay and several interviews. In the one case the company owned the mill, and was improving its own property by the addition of the escapes, in the other the employers were tenants and contemplated leaving the premises a year later, and wished to postpone or entirely avoid the expenditure.

As to fans, there are several varieties, all good for removing air, but some of them are of no use for removing the heavy mineral dust thrown off tumbling mills in foundries, which in some cases are in use where men are working. I believe the best for this purpose is the Sturtevant make of Boston, Mass., or any similar in construction. I do not consider the disc fan suitable for this purpose, though good for the removal of air, light dust from wood, fumes, steam, etc. I have seen this tried for the removal of heavy dust, but it was of very little use in this respect, while where I have seen the Sturtevant make applied properly it did its work very satisfactorily.

The putting in of a fan means an expense of from one hundred to six hundred dollars, according to its style, capacity and arrangements to operate it, and in these days of dull times, strong competition, slow sales and small profits, if any, employers do sometimes feel aggrieved when asked to incur this outlay of money.

In making my inspections I do not overlook the unsatisfactory state of trade in many industries, and in some cases have passed by some alterations required, that I would not have done had trade been more prosperous, as regards these factories. In one case I had required a fire-escape to be put on a factory. After a few weeks I received from the occupiers a request to extend the time for having it completed till a certain date a couple of months ahead, to which request I rather reluctantly consented ; but before the extended time had arrived the firm made an assignment for

the benefit of their creditors. On learning this I thought I saw the reason for wanting a delay. The building is now unoccupied, and there is no escape on it, nor is the man who was to make the escape a creditor to the firm for it.

The Inspector has at times to make suggestions that are not at all welcomed by the employer, and it is gratifying to me to be able to say that in the pursuance of my duties this year, nothing of an unpleasant nature has occurred with any of the persons among whom my duties called me, and, further, I have every reason to believe that most of my suggestions have been carried out, so far as time for doing so would permit, for some of them are of recent date.

It was with regret that I noticed in the majority of factories which I visited during the first half of the year that the number of persons employed was very much less than on former occasions, owing to the great contraction of trade through former over-production, bad harvests and low prices to farmers during the two previous years; and it is to be hoped, as many seem to expect, that the abundance of this year's crops of grain, fruit and roots, and the advance in prices of most grains will show a marked improvement in trade during the coming spring.

In talking with manufacturers on the state of trade I am frequently asked, "Is there any line of manufacture that has any life in it?" And I have generally replied that so far as I can form an opinion by going through factories, the piano and coffin trades seem to be as brisk as ever, having noticed continued activity in these two branches from the time of my first visits in 1887. It has ever since been a puzzle to me what becomes of all the pianos that are made in my district; and as to coffins, the demand seems to be steady for the number of persons now engaged in making these articles, and cannot be expected to increase much till the population of the Dominion increases at a faster rate than the last census shows it to have done. Here I am reminded of a conversation which I had early in the year with a manufacturer of coffins on a large scale, on the subject. I was asking if the form of influenza known as la grippe, which made its first appearance here about the beginning of the year before (1890), had in any way affected his business. He replied to the effect that it had greatly increased the demand for coffins for a time, and that it made his sales for February of that year about five thousand dollars greater than in the corresponding month of this year. His figures may have been given somewhat at random, but the fact remains of the great increase in the activity of this trade for a time when the disease was at its height.

By mentioning the piano and coffin trades as being good I do not mean to say that they are the only ones; there are here and there special lines of manufacture in which competition is not so keen, and others which are favorably circumstanced as to capital, ability, enterprise, etc., that do not seem to feel the depression; but, generally speaking manufacturing trade this year and last has been in a depressed condition.

One effect of this depression in manufacturing is towards some relaxation in the working hours of females in some branches. Another effect is, owing to the ease in which older help can be obtained, to do away largely with the employment of children, (males between 12 and 14 years of age) in many industries, which has made the Inspector's duty in this respect comparatively light. Though I am of the opinion that should a fair improvement in the demand for manufacturers show itself, the number of children employed would materially increase.

The textile industries still, as a rule adhere to the usual hours of sixty a week, though I know of one large factory (working wool) running only fifty-five hours this winter, as an experiment, and I have been told that these hours would probably be continued. There are also some smaller woolen factories working fifty-seven and one-half hours per week. I know of no factory in the western district where the weekly hours for males exceed sixty, unless when occasionally working overtime. In a few industries the men work nine hours a day.

I take the following from the Fifth Annual Report of the Factory Inspectors of the State of New York, fol. 546, (year 1890): "Total number of establishments in which

boys under 18 or women under 21 years of age were prohibited from working more than sixty hours per week, 708." In looking over the working hours of some of the above alluded to, I find quite a number as working sixty-six hours a week.

The following are the weekly working hours of females in some of the principal trades in Toronto, west of Yonge street. Baking powder, 55; bookbinding, 50 to 55; baby carriage trimming, 54; boots and shoes, 49; brooms and brushes, 55; binding and other twine, 48 to 50; caps, 49 to 50½; coffin trimming, 50; corsets, 47 to 50½; clothing, 50 to 57½; cigars, 44½ to 50; envelopes, 53 to 55; electro-typing, 48; fringe and tassels, 54; fancy boxes, 54; furs, 53; hats, straw and felt, 52½; india rubber goods, 50; jute and cotton bags, 49; knitting, 54 to 60; laundries, 55 to 60; millinery goods, 49; overalls, 47½; paper bags and boxes, 49 to 53; printing, 56, rope making, 60; soap, 52; thread spooling, 52½; tobacco, 52; trunks and valises, 52½; ladies' white wear, 50 to 56; window shades, 53; wall papers, 51½; umbrellas, 54.

In some of the above industries two sets of hours are given, that means there are more than one establishment on that class of goods, and their working hours vary. I give the shortest and longest.

In some trades the hours are the same in all the factories. In other cities the hours are about the same, but in the smaller places are somewhat longer. In some of the above mentioned trades males are also employed, and usually their hours are longer, generally ten hours a day. From what I see, read and gather in conversation, from employers and employed, I feel convinced that the tendency is towards shorter hours than at present prevails, where 60 hours a week is the allotment.

Many factories shut down from two to ten weeks in the winter, and others such as those engaged in manufacturing harvesting implements do so, or greatly slacken down in the summer, when the sales for the year are done. Some cotton mills have not made one-half time with full staff in the two previous years; though this year, owing to a number of the principal mills on grey goods coming under the control of one company and thus working to better advantage, the cotton trade has improved. Not long ago I noticed that one company had declared a dividend of seven per cent., and no doubt other companies also have divided profits. I observe that the number of occupations in which females are employed is gradually being enlarged, and it is now not at all uncommon to find them doing work that fifteen or even ten years ago would have been considered as out of harmony with public opinion, for the employer to ask them to do, such work at that time being considered proper for males only. There are various reasons for this to which I need not allude, but I cannot in my own mind justify all the reasons. I frequently meet with persons who think that females should not work in factories, but instead, sufficient wages should be given to fathers and brothers to enable them to keep the girls at home, and thus not go into competition with male labor. But there are many trades in which at least a portion of the work is more suitable for females, and can be better done by them; though in the clothing and other wearing apparel branches of trade, males do in some cases operate the sewing machines and do the ironing of shirts. So it seems that if females are encroaching on the field of labor which was formerly considered as exclusively belonging to males, the latter, on the other hand, are spreading out on the territory devoted to female labor. In mentioning the occupations in which females are employed, I refer only to this Province, particularly to the western district. In other countries, in the old world, females have long been doing most laborious work, much of it under most degrading conditions, which are being slowly improved by legislation.

Overtime.

I have granted overtime permits to twenty-six different factories during the year, against twenty-three in the year previous.

Children.

I found very few children (males between 12 and 14 years of age) this year at work. Even fruit and vegetable canning factories, which four years ago employed so many

without regard to age, during the season, by the adoption of machinery, can to a large extent do without them. The corn is hulled, the peas podded, the cherries pitted and the apples prepared by machinery nowadays, dispensing almost entirely with child labor; even where light manual labor is required the canners prefer older hands to do it. The abundance of fruit and vegetables this year made business very brisk in the canneries. The Legislature this year passed the Truancy and Compulsory School Attendance Act by which all children, with certain exceptions, under 14 years of age shall be sent to school. By this Act the truant officer can visit factories and send out to school many of the boys under 14 years that are legally working under the Factories' Act. This law, if generally enforced, will take out of factories the greater part of any children at present employed. The Act only came in force in July of this year, and so far I have not learned of any children having been removed from their employment under its provisions. Although the proportion of boys under 14 years of age at work in factories is very small, there is ample opportunity for this new law to do good work in a few of the localities I visit. I have accidents reported this year to six boys under 14 years that might have been averted had the Act been in force earlier. Of course this law does not apply when school is not in session, nor during holidays. Below I give a copy of two letters, one to me, and the other to an employer, which will go to show that the restrictions of the Factories' Act in regard to age, while on the whole good, do in particular cases incur a hardship on individuals:

. . . May 28, 1891.

Mr. Blank,—

My Dear Sir,—Could you not give Mrs. . . 's daughter employment. Of course she is a minor, but they are badly in want, and I do not think that anything would be said.

Yours truly,

. . . .

Mayor.

The other is addressed to me as follows:

Dear Sir,—I take the privilege of asking your consent, if you will kindly allow me to go to work. I have no father, and mother has worked and supported us for six years past. Her health is failing and she cannot stand such hard labor any more. I had to stop out of school two weeks at the summer examination or I would be in the fourth book, but I had so much headache that I could not stand it. I am nearly 13 years old; am in the senior third class.

From yours sincerely,

. . . . . .

P. S.—Mother spoke to the truant officer about it, and he said we should write you will you please apply (reply.)

From these letters will also be seen the reason why females, sometimes very young ones too, work in factories, and not always at such work as they would choose, but frequently at such work as they can obtain.

Alterations.

All alterations and changes required by the Inspector to be made in factories fall on the employer, whether he be owner of the premises or merely tenant. Now, there is one order occasionally given, that involves, as before mentioned, considerable expense, viz., the erection of fire-escapes, the cost of which, I think, properly, should fall on the owner of the building, whether he be the occupant or not, as it is a permanent improvement. Particularly so, should this be the case where there are two or more occupiers of factories in the same building, as frequently happens, some of them on so small a scale in manufacing as to employ only six persons, just sufficient to bring them under the Act; and in many cases with scant capital, and none to spare in improving the landlord's property. Under such conditions it does not seem just to compel an employer to erect an escape

for the benefit of his operatives, which may also be used by those of another employer in the same building in an emergency. It would be superfluous in some cases, to ask each occupier, where there are two or more in the same building to erect an escape, and the law does not provide for the building of one jointly, each contributing a portion of the expense. In some such cases, as above referred to, I have been told by employers that if I enforced the order to erect an escape, they would vacate the premises. Thus the responsibility is left on the Inspector, either to compel the occupier, at more or less expense, inconvenience, loss of time and interruption to his business to seek other premises; or to allow the employés to be without this additional means of exit in case of panic from the alarm of fire or other cause. I was fortunate this year in persuading one landlord in this city, owning large premises with power for factory purposes, having several tenants coming under the Act, to erect at his own cost, a fire escape for the benefit of his tenants. But as a rule the owners are obdurate, and will not contribute any portion of the expense. The same remarks will also apply to a certain extent to closets, especially in cities where they are required to be connected with sewers, the cost of which in Toronto is from sixty to eighty dollars, which sum, though not large, is, at times, a very serious item with many of the smaller employers. I would be glad to see the law so amended as to require owners of factory buildings to put such buildings in accordance with the Act, so far as fire escapes and closets are concerned, especially where there is more than one employer. The Inspectors' duties in these respects would then be simplified and carried out more satisfactorily.

In a few instances I have persuaded owners to provide suitable closets for the operatives of his tenants. There are places where labor is largely employed that do not come within the operation of the Act, where in the clothing trade the workers, male and female get their work from different establishments, and engage premises all together, fit it up with the appliances necessary to that trade, each worker contributing so much weekly towards the rent and other expenses on the co-operative plan. No one on the premises is the employer, and the Inspector has no authority to bring such a place into conformity with the Act. Other places also exist, somewhat different, where one person will engage a room, fit it up with tailors' sewing tables, stoves for heating irons (tailors' goose) and other requisites to the trade. He will rent to each worker sitting space with the use of the irons, stove, etc. These workers get their work from different tailors, all are their own masters to come and go as they please so long as the job is finished in the time required. In such places the Act does not apply and the owner of such premises in each of the above cases should be required to put them in conformity with the law as to fire-escapes and closets.

Extension of the Act.

As I previously intimated to you the ladies of the Womens' Christian Temperance Union are contemplating asking the Government to extend the operation of the Factories' Act to stores, so far as to provide separate closets for salesmen and women, where both are employed. The law now only applies to the workshops connected with stores, where clothing, millinery, mantles, dresses, etc., are made, and not to the salespeople, which is the object these ladies have in view. As to the propriety of such legislation I need make no remark. Should the ladies present their case to you, and the Government think proper to introduce the proposed amendment, I feel sure that the merchants of the Province concerned will readily conform to it. Many would not wait for legislation, but would provide the necessary accommodation at once, on the matter being drawn to their notice. No doubt but that in most cases where the evil exists, the subject has not been given a thought.

Prosecutions.

Though I have during the year met with many cases where some slight violations of the Act have occurred, through not attending to some of its provisions, still I have not met with any such that I considered as intentional, but rather an oversight. I might more particularly refer to the non-reporting of accidents, and occasionally employing a child without first procuring a certificate of age. I have not thought it necessary to lay these matters before you and recommend prosecutions, believing that in time as employers be-

come more familiar with all the provisions of the Act, the inspector will have very little to complain of. Prosecutions, I consider, should be resorted to only when violations seem wilful, or through indifference, and where other means fail to have the law observed.

Accidents.

To the occurrence of accidents I have given particular attention, using every endeavour to ascertain if any had happened, and if so to have them reported, and to examine into the cause where I thought necessary with a view of preventing a recurrence under similar conditions, so far as possible. The enquiry into the cause of some of these accidents has shown me many dangers that I did not previously suspect for which in many instances I have been able to suggest some safeguard ; though I regret to observe that a large proportion of them are of such a nature that factory inspection cannot prevent. Many occur through gross carelessness on the part of the injured person or of some of his shopmates, and some are entirely unforseen and are accidents, pure and simple,—such as the bursting of an emery wheel, saw or pulley, the throwing of sticks and slivers from saws and planers, and some others that occasionally happen. Some of these may be foreseen, but not so generally.

In comparing the accidents reported to me this year with those of the two previous years, I am gratified to note that the number occurring from preventable causes such as gearing, belts, elevators, vats and explosions are very much less ; and it was satisfactory to me to be told on two or three occasions this year by employers in manufacturing centres that by their own observation accidents in their neighborhood were much less frequent than formerly. Quite a number of those reported in the appended list are from factories not previously visited and some from those visited but once before.

Though the number of accidents reported to me this year, viz. 104 is greater by 9 than were reported last year, (95), I account for this slight increase by the fact that employers are more careful in complying with this requirement of the Act, and that I have personally or by letter made enquiries after seeing the account of an accident in a newspaper. It must be borne in mind that many accidents that happen in factories are not reportable. The law applies only to those where the persons are injured through fire, or by machinery moved by steam, water, or other mechanical power, or through a vat, pan, or other structure, filled with hot liquid, or molten metal, or other substance, or by explosion, or by escape of gas, steam, or metal ; and only when the employé injured is unable to return to his work within six days after. Many accidents happen outside of this enumeration, and such are not reportable, though I have included one in my list as it was fatal, viz : A boy of 17 years of age was called upon to assist in loading a heavy baling press on a waggon ; it fell on him causing his death before the day was done. I have two reported as hurt by bales of cotton falling on them, and others from other causes not within the Inspector's jurisdiction, and which I have not included among those recorded.

I frequently, in conversation with employers about accidents, ask them to report all to me, with particulars and I will judge if they are reportable.

Of the 104 accidents reported to me this year three were fatal, and in another case lock-jaw set in, and the boy died fourteen days after the injury, though up to within a day or two of his death no serious result was anticipated, as he was going about and almost daily called on the doctor to have his fingers dressed. Of the three persons who were killed, all in February, one as before mentioned, by a baling press, one was caught in a belt while trying to put it on a pulley, and the third, a boy, was swinging in a belt, which wound around the shaft above, killing him. I may mention that whenever I notice a belt hanging on a shaft, I ask to have a hook put up to hold it ; and I occasionally observe that where there are hooks the belts are not always put on them when they should be. There were seven fatal accidents reported to me last year.

As usual, wood-working machines are responsible for a large proportion of serious accidents. The total reported to me during the year from these is forty-nine of which fourteen are cuts from saws, circular and band, one from a saw breaking and flying pieces striking a man ; two from sticks and slivers thrown. There were thirteen from planers

and shapers, four from stave cutters, three from sand-papering machines, and the others from various causes incidental to machinery in general.

In the metal industries, principally iron and tin, there were reported thirty-four accidents, twelve of which occurred in the tin stamping business and these mostly in the power press-fingers off. In wire-drawing were three, several occurred through weights falling, and the others in various ways as will be seen by examination of the appended list of accidents. The textile manufactures reported thirteen injuries as follows, one from card grinder, five from pickers, three from mules, one from scalding. Gill box one, and gears two. Laundries report three accidents, two in ironing machines and one in a mangle.

Of the injuries reported, only seven happened in gears, and in some cases these were guarded as far as practicable. Some were caused by cleaning in motion.

Three are reported as occurring from elevators, none of which could the Inspector prevent by any powers he has.

Three persons had ribs broken, three their hands crushed between a grindstone and frame, five had a foot injured, three an arm. Twenty-one hands were hurt—not including injuries to fingers—two hands were amputated. Of fingers sixty-six were lost, wholly or in part.

Six females were injured, same number as last year. Their ages vary from eighteen to forty years.

Of the males meeting with accidents whose ages were given in the reports to me, twelve were fifteen years or under, two were only thirteen years; thirty-seven were between fifteen and twenty-one years, twenty-four were between twenty-one and fifty years, two were sixty years, one was sixty-three and one seventy-two years old and he is reported as likely to lose his hand.

In making the report of an accident some employers do not give sufficient particulars, and I have frequently to write for further information; but so far as given me, I find that accidents to right or left hands in certain trades are as follows:

In wood work,	9	to	right hand	or fingers.
do	14		left do	do
In metal work,	11		right do	do
do	5		left do	do

Textiles about equal.

Accidents this year were reported from sixty-nine different factories, against sixty-two the previous year; forty-one of those reporting this year had not previously reported any; eight of which were visited by me for the first time during the current year.

Eight factories reported	2	accidents	each	16
Five do	3	do		15
Two do	4	do		8
One do	5	accidents		5
One do	8	do		8

Showing that fifty-two or just one-half happened in seventeen factories.

The tin stamping industry shows a much larger percentage of accidents in proportion to the number engaged in it, than any other in my district, nor do I at present see any means of reducing it, nearly all depends on the care of the operator. The work is monotonous and constant, requiring continuous watchfulness, and it is no wonder that the mind, the sentinel, occasionally goes off duty from fatiguing attention and leaves the fingers exposed to danger. I notice by the report of the chief inspector of factories and

workshops for Great Britain, for the year ending October 31st, 1890, Mr. A. J. Redgrave, H. M. Inspector for South London, referring to accidents from these presses writes as follows:

I have again to deplore the numerous accidents at tin-ware stamping presses, notwithstanding the sytem of guards, invented by Mr. Shaw, which are attached to the under or female dies in such machines.

* * * * * * * * * * * * * * *

The danger is obvious, and to my mind, calls for some legislative enactment restricting the employment of young persons and women to those processess only whereat guards can be fixed on Mr. Shaw's system, by which the feeding of these stamping presses has been made perfectly safe, but other parts of the manufacture, such as cutting up large pieces and scrap tin, in the first instance cannot be rendered free from danger. These stamping presses being thrown in or out of gear by a treadle, and a somewhat sensitive action, the foot and hand, both of which work together, sometimes fail in accord, and the heavy top die comes down on the fingers before they are clear of the lower die. Now such an employment as this is the most dangerous within my experience, and not fit for such persons as factory legislation seeks to protect.

The guard Mr. Redgrave mentions seems to be unknown to the tinware manufacturers in this Province, so far as I am aware. I have written to the makers for some further information.

I am far from believing that all accidents from these presses are the result of carelessness, though, no doubt many are. It is not possible to give the constant attention at all times, that these machines require. The mind of any person is liable to wander at times through ill health, loss of sleep, anxiety, or other cause: and were they, at such times, engaged in some dangerous occupation, the probability is that they would receive some injury. There is an old adage that "Accidents will happen in the best regulated families," so they sometimes happen to the most careful of people working about machinery.

In pointing out to some employers, belts and gears on some of their machines which require to be guarded, I am met with the reply that the attendant is a careful, steady person, or that there is no occasion for him to go around to that part of the machine where the exposed gears are. The impression conveyed by the Act to some employers seems to be that it is the welfare of the attendants of the machine only that is to be considered, but experience has shown me that accidents happen from machinery to others besides the attendants; hence the necessity of guarding to protect all employés from receiving injury, even if their duties do not require them to be near the machines.

As well as alluding to the subject in a former report I have also spoken to several manufacturers of machinery, suggesting that they cover the gears of the machines they build to sell, and I am glad to be able to report that there is an improvement in this respect, still there is much room for further progress. I have also made some suggestions to some of the builders of elevators with a view to increase their safety or lessen their danger—as you will—which I am glad to ascertain have been adopted.

For the dozen or so of fatal accidents reported to me during these last three years, I am aware of only two coroners' inquests having been held over them. I am of the opinion that an inquest should be held over every fatal accident happening in factories, even where the cause of death is apparent, to show if there was any negligence on the part of any one, to which the accident might be attributed; and also that the Factories' Inspector of the district should be notified to be present.

ROBERT BARBER,
Inspector of Western District.

Toronto,
December 31st, 1891.

CENTRAL DISTRICT.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to submit the following Report on Factories' Inspection in the Central District for the year 1891 :

As the Truancy and Compulsory School Attendance Act requires the attendance at school of all children between the ages of eight and fourteen years, it might be well that boys and girls before being employed by any person should be required to produce a certificate from the principal of the school they may have attended as to their ages. And were children required to pass a certain standard of education before being allowed to work, parents who are indifferent as to whether their children have a rudimentary education or not, but who were desirous of having them at work, would of necessity be compelled to see to their children's attendance at school until such standard was attained.

CLOSETS.

It is to be regretted that some employers, and who themselves are fathers of families, should be so indifferent to the welfare of their female employés in the matter of providing closet accommodation. In one case I learned that not until the females had begun work in a factory was an order given for the erection of a closet for their use, thereby causing them to work four days without such convenience. In another case females were expected to cross a public street; and in yet another to walk over one hundred yards to a railroad station in order to obtain access to the necessary conveniences. Having in my last report drawn attention to the necessity of providing separate conveniences in stores where not already provided, I need not further allude to the matter.

HOURS OF LABOR.

Complaints have been made that dressmakers and milliners, at certain seasons, are required to work overtime, especially on Saturdays. The Inspectors cannot be expected to know of infractions of the Act in regard to females being required to work over the time limit allowed by the Act unless they are notified of such infraction. If the parents or relatives of those who are called upon to do so, would send information to the Inspectors the matter would be attended to. It has been stated that the necessity for working over-time is due to ladies being desirous of having dresses and bonnets finished for Sunday. If such be the case, in the event of a prosecution for working over the time limit allowed, it might be well that the name of the lady for whom the article is being made, causing a breach of the Factories' Act, should be made known. In some cases I have learned that females on Saturday nights are required to assist in selling in stores, after they leave off work in the factory or workshop.

ACCIDENTS.

The number of accidents reported as having occurred during the year are eighty-two. In one case a "bull ladle" is reported as having been "burnt through," whereby four men were burned with molten iron. In another the explosion of a boiler caused the death of one man, also two men badly scalded as well as three others slightly. So that the persons injured during the year number eighty-nine. Three of the accidents were fatal, but no coroner's inquest was held in any of the cases.

One case which occurred in the lumber yard at Deseronto, wooden stakes had been removed from their sockets on a car on which a transfer car (intended to be run into a dry kiln) was being loaded with planks; the removal of the stakes allowed the transfer car to drop some three or four inches off the rails, causing the planks to fall off the car, killing one man instantly.

In the case of the boy who fell down the hoist at Kingston, a bar or rail used as a guard was not in its place as it should have been.

And in the case of the boiler explosion at Sundridge, an inquest would have brought out the fact of the lever of the safety-valve having been changed and a longer one substituted, "as the one that came from the shop was not strong enough to stand the weight of the ball, it would bend with the ball on." It is also alleged that the safety-valve was "weighted down" at the time of the explosion. The length of the original lever was twenty-two inches, that of the substituted one, thirty-eight inches.

If manufacturers of machinery would cover the gear and other dangerous parts of all machines which they manufacture, as is done in Britain, the number of accidents would be lessened considerably. And if employers who purchase machines would insist on the dangerous parts being protected before completing the purchase, their liability under the Workmen's Compensation Act would be greatly reduced.

Seventeen accidents have been caused by circular saws, ten by power and drop presses, and nine by gears. Those which have occurred by gears might all have been prevented had the gears been guarded as required.

While there are many employers who are anxious to do all they can to prevent accidents, there are others who, either from indifference or niggardliness, neglect to provide for the safety of their employés as required under section 15 of the Factories' Act Such would do well to remember that they are liable to prosecution under section 14 which reads: "It shall not be lawful to keep a factory so that the safety of any person employed therein is endangered, or so that the health of any person employed therein is likely to be permanently injured, and whoever so keeps a factory shall, upon conviction thereof incur and be liable to imprisonment within the common gaol of the county within which the offence was committed, for a period of not more than twelve months, or to a fine of not more than $500, with costs of prosecution, and in default of immediate payment of such fine and costs, then to imprisonment as aforesaid."

The number of accidents from circular-saws, during the year (seventeen) is less than either last or the previous year, the number for last year being twenty five, and for the previous year twenty-eight. No fatal accidents have been caused by circular-saws this year, as against two in each of the two previous years.

In several of the saw-mills, band-saws have been adopted for cutting lumber, instead of circular-saws. Owing to the blade of the band-saw being thinner, an increased amount of lumber is obtained from a log, by its use. As no accident has yet been reported from any saw-mill as having been caused by a band-saw it may be confidently hoped that the number of accidents may be lessened by its adoption generally.

When steam has been superseded by electricity as a motor in factories, the danger from boiler explosions will be reduced to a minimum, boilers being required at central stations only.

Prosecutions.

There have been three prosecutions for offences against the Factories' Act. One employer for employing a boy between the ages of twelve and fourteen years without having a certificate of age in his possession. The boy had his hand hurt in rollers, and on investigating in regard to accident I ascertained that he was not 14 years old, and that no certificate of age was in possession of employer as required. On lodging information for contravention, I explained to the magistrate, that as the accident had been reported, I only asked for a nominal penalty in the event of conviction. The defendant having plead guilty was fined one dollar. Another employer was prosecuted for a similar offence. In this case the boy fell down a hoist and died on the third day thereafter. The accident was not reported; it having occurred on the 9th of April, I only learned of it on the 9th of June. The Police Magistrate dismissed the case, on the ground that the time limit, two months, had expired in which proceedings could be instituted. As two months had elapsed from the time the accident ocurred until I heard of it, I could not be expected to institute proceedings until I had learned of the infraction. In this case by contravening the Act, in not reporting the accident, the employer goes free for contravening another section requiring him to have a certificate of the boy's age. In the

former case the employer who complied with the requirements in reporting the accident, was, in consequence of doing so, found to have contravened another section of the Act, and was fined accordingly. There certainly would require to be some amendment to the Act to cover a similar case. As I have already reported on this case I need not further allude to it.

One employer was fined $2 and costs in each of three cases for employing girls under fourteen years of age. One girl was nine years, one ten, and the third twelve. This employer appeared to consider herself a deeply injured individual, because she was interfered with, and informed me that I would get tarred and feathered the next time I came out. It is very unsatisfactory dealing with female employers who are of a masculine turn. As it was at her own special request, that I should prosecute her instead of the manager as I had intended, I felt rather hurt at her ingratitude.

A complaint was made to me, (the only one of the kind I have ever received) that the employés in a certain paper mill suffered greatly in consequence of their being no regular pay day that they could depend upon, in order to enable them to meet obligations incurred, and that in consequence, they, unless specially favored, had difficulty in obtains ing credit from storekeepers who, however willing to accommodate in giving credit-were unable to do so owing to the uncertainty of obtaining payment. It was stated that it was not from inablity to pay but from a spirit of procrastination due to thoughtlessnes, or indifference to the welfare of their employés which is inexcusable. As I had occasion to write to the employer who was absent at the time of my visit, I mentioned to him that such complaint had been made, stating that I would mention the matter in my report, giving him an opportunity of contradicting the statement.

It would be interesting to have the proportion of those engaged in the various industries of the working population of the country, so that it might be ascertained in the event of a depression in any industry, whether an undue proportion were engaged in that particular industry, in order, if practicable, to have the number regulated accordingly. It is to be regretted that a hap-hazard system obtains in regard to the labor of a nation. If in order to obtain the best results in a factory the labor in that factory must be systematised, much more does it appear necessary to systematise the labor of a nation.

While an increase of immigration is advocated in order that the fertile lands in the North-west may be cultivated, it may be well to quote a paragraph from the *National Economist*, which reads: "The farmers of the United States received $48,000,000 less for raising 76,000,000 acres of corn in 1886 than they did for raising 68,000,000 acres in 1883, though the crop of 1886 exceeded that of 1883 by 116,000,000 bushels. Such contrasts in value are shown from year to year in all crops." If such contrasts are shown from year to year the industry of the farmers in cultivating the 8,000,000 acres more in 1886 was a positive injury to them, in a monetary sense, and would lead to the belief that a bureau for regulating the labor in various industries is necessary or should at least be tried. If supply and demand regulate the price of products, there would appear to be a necessity for regulating the supply of products.

I visited the saw-mills at Rat Portage, Norman and Keewatin in the Rainy River District, and also in Algoma District to Sudbury, and from Sault St Marie to North Bay. In one case only did I find any boys under age; some two or three were casually employed in the lumber yard of a saw mill. The mills in the Rainy River District in regard to protecting dangerous places were in advance of many of the mills in older settled localities; especially was this the case in Norman and Rat Portage.

Seven permits to work overtime were granted during the year.

I append herewith a return of accidents for the year, as also a return of the prosecutions for the same.

JAMES R. BROWN,

Toronto, December, 31st, 1891. Inspector of Central District.

PROSECUTIONS FOR OFFENCES, 1891.—CENTRAL DISTRICT.

Date.	Parties summoned	Magistrates and place of hearing.	Nature of offence.	Fine.	Costs.	Remarks.
				$	$	
May 29..	John Hoerle, Hanover.	E. A. Goodeve, J.P., and ..... J.P., Hanover.	Employing a boy under 14 without a certificate of age.	1 00	.....	I requested the magistrate to inflict a nominal fine, as defendant had complied with requirements of Act in reporting accident
June 19 ..	William J. Crothers, Kingston.	Police Magistrate J. Duff, Kingston.	Employing a boy under 14 without a certificate of age.	.. ..	... ..	Case dismissed owing to time limit (two months) having lapsed. In this case, by contravention of the Act in not reporting accident, he is free from the consequences of an infraction of another section of the Act. The time limit had elapsed before I heard of the infraction.
Sept. 22..	Hannah M. Vermilyea, Toronto Junction.	J. M. Wingfield, J.P., and Stevenson, J.P., Toronto.	Employing three girls under 14.	6 00	6 25	$2 and costs in each case.

EASTERN DISTRICT.

To the Honorable the Minister of Agriculture:

SIR,—I beg herewith to submit my report of inspection for the year 1891. At my inspection this year, of factories and mills I have noticed an improvement in the construction of machinery which renders them safer and less liable to cause injury. Some few years ago machinery was used for but one purpose, that of performing a larger quantity of work at a less cost regardless of the risk and danger to those who had charge of running it, but at this present time all machines used are constructed with more care and are less liable to cause injury if the employés in charge would exercise prudence. There is still one difficulty to overcome. The keen competition which exists in manufactured machinery might cause the use of material of inferior quality, and less care in its construction, in order to be able to reduce the prices and make sales. In machinery of rapid motion or on which there would be more strain this would be dangerous, as they would be more apt to break and cause serious, if not fatal injuries. If it was possible that legislation could compel the manufacturers to produce but safe machinery, and to render them liable for damages in accidents caused by defect in its construction, it would have the effect of diminishing the cause and danger of accidents, as otherwise the employers, as a general rule, place and run all machinery with all the necessary protection.

I have during this year inspected several establishments not really coming under the Act, owing to there not being employed the required number of hands, but as these places were of a sufficient capacity to employ a larger number of people I thought proper to inspect them and take with regard to them such steps as the Act would permit and authorise, to suggest and order proper protection to machinery and fencing in belts.

The general orders given this year for protection were as follows:

Edging and circular-saws in several mills, the protecting of belts in doors and sash factory, and fencing in openings in floors of mills. I have noticed in one of Mr. McLaughlin's saw-mills in Arnprior that the guards which had been placed over one of the edging-saws had been removed and laid down alongside the table, and the saws were allowed to be used in that condition during part of the summer.

When I drew the manager's attention to the fact, he informed me that the protection had been placed as soon as ordered, but that the man attending the saw had removed it altogether to save himself labor and trouble. This I found had been done in several other places and allowed by foremen to be done. In all cases I informed the manager that the recurrence of such things would be followed by prosecution without any further notice.

BOILERS.

I have noticed that of the two factories which had boilers in basement of buildings with employés working in upper stories over them, one has been altered, and at the time of my visit of inspection they were altering the building and agreed to remove the boilers in a separate building where no other person but the boiler attendant would be allowed to work.

There is still in Cornwall, at the Stormont Cotton Mills, one building having in its basement nine boilers of 80 horse power, and over which there are between forty and fifty persons employed in three different stories who would meet a certain death if any explosion happened. The boilers in several factories are insured in good and reliable companies, and thereby subjected to a proper inspection twice a year, which is to some extent a protection, and I believe that Legislature should compel all manufacturers using boilers to have them so insured and subjected to such inspections. This would tend to diminish the danger of accidents considerably, as none but safe and first-class boilers would be accepted by reliable companies. I also consider that it would be advisable that no persons should be placed in charge of boilers and engines unless properly examined by a competent board on whose certificate only of competency they could be employed.

Child Labor.

The most important question in connection with the Act of Inspection of Factories is that of the employment of children. The Act provides that no boys under the age of twelve years and no girls under the age of fourteen be employed in any factory; the Act also provides that no boy between the ages of twelve and fourteen, and no girls between the ages of fourteen and eighteen, and no woman be employed more than ten hours each day or sixty hours in any one week. In my previous report I have suggested that the minimum age for boys be placed at fourteen instead of twelve on the ground that boys under that age could not be sufficiently conscious of the dangerous character of machinery and of the prudence they require to have when working or running it. Noticing at every visit of inspection and in every instance where children were employed their extravagance and gross carelessness in the performing of their work, and considering that the standard of a nation depends upon the proper development, both physically and intellectually of its children, and the large number of them employed in factories subjected to such labor and long hours of confinement as are injurious to their body and mind, I made it my special subject of observation.

When the Act was put in force, this question of employment of children was surrounded with difficulties, as the employer seemed to consider that class of labor as very saving and economical, and would only reluctantly comply with the Act and obey the orders of inspectors; but now he admits the necessity and benefit derived from such laws, and even shows some anxiety to have the minimum age raised to fourteen to be able to resist the importunities of those who seek employment of children, as in nine-tenths of the cases, they are forced upon the employer through the influence of leading workmen or their parents employed themselves in the factory, under the pretence that they refuse to go to school and if not employed would remain on the streets and be out of their surveillance; whilst the true reason is a selfish desire to increase the revenue of the parents to enable them to live more in luxury and extravagance. In other cases children are sent to work to allow parents to remain idle and live in laziness and in all the evils which follow. I have noticed cases of this kind in Cornwall. In one of them a certificate of proper age was given, but when the child was questioned he admitted frankly of being under age.

I have lately met with another case of great hardship and selfishness on the part of the parents, which I have now under consideration. One boy under fourteen years of age, whose sight is affected, having, I believe, lost one eye and the other being very weak, was sent to work in a factory, having a certificate from a M.D. that he could not attend school without danger to his sight. I gave an order that he be dismissed from the factory, when the father secured another certificate from the same M.D., stating that his sight was sufficiently good to allow him to run ordinary machinery.

I have also very often seen children sent to work in factories during school vacation, and kept there confined every day during ten long hours with their parents, who, through their influence, have succeeded in securing them employment, and thereby through their contemptible and selfish motives and desire to swell their wages a few cents deprive their children who have attended school during fully ten months in the year of those few weeks' vacation given to them in order to restore their body and rest their mind by an open air exercise and absence of study so that they may be better prepared to benefit by the following year's schooling.

I have also observed that the large majority of children who have been confined and subjected to permanent labor, whether in factories or saw-mills, though of strong and robust parents are of dwarfed stature and dull-minded, and condemned to become in future inferior and useless citizens, unfit to discharge their duties towards the State in an intelligent manner—a more serious fact than we generally seem to admit.

To place young children in factories with a large number of grown-up persons is attended with dangerous inconvenience and very often serious results, as at their young age they are more liable to be affected morally by listening to coarse and often obscene language which they are exposed to hear where so many are employed, and the ordinary ob-

server will notice, as I have done myself, the coarse and vulgar language used by those children when walking on the streets after their day's labor.

These facts I report from personal observation, as I have given this very important question particular attention, together with that of proper ventilation and fire escapes in order to ascertain the remedies and to be able to offer some proper suggestions.

With regard to the questions of employment of children, I can only repeat what I have said in my previous reports, that the school laws compelling children to attend schools should be enforced, and that the minimum age of employment be raised two years. I would also add that no children under sixteen years of age be employed unless they can read and write, and that their time of labor should not exceed say eight hours per day.

Ventilation.

The next question in importance to the employment of children is the ventilation of work-rooms. In every one of the factories in my district the rooms are large and none over-crowded with people and machinery, and can well and properly be ventilated by the windows during the summer season, but during the winter there being no other way of renewing the air than the occasional opening of doors, the persons remaining therein during some five hours at a time must naturally breathe a considerable amount of foul air, injurious to their health.

In my last report I mentioned in this respect the rag picking and assorting department in the mill of Toronto Paper Co. in Cornwall. I again notice further improvement this year in the shape of a suction pipe drawing the dust outside of the building, but as it did not seem to take it all away, I ordered the pipe to be extended to the centre of the room and if not found sufficient some other means of ventilating properly their rooms to render them harmless will have to be adopted.

I have spoken to the managers of all factories which are run during the winter season about adopting some method of ventilating, and they have in every instance informed me that the inspectors of insurance companies object to them establishing drafts. I believe it would be advisable that all the inspectors of the Province should meet to take the matter into consideration and consult some practical and competent men and adopt some system which would meet all the requirements.

Along with the ventilation should be considered the cleanliness of factories. I am pleased to be able to report upon that question, that in every case the factories employing a large number of persons are kept in a perfect state of cleanliness. In certain places a person is kept constantly for that purpose, whilst in others they take a certain time every week to make a general cleaning. There are some establishments where few hands are employed neglected in that respect; but I must say, that upon my recommendations they are paying more attention to this matter, and I remark a gradual improvement every year.

All factories are provided with proper water-closets, and, in most cases, have separate approaches. There are still a few in the Canada Cotton Factory, in Cornwall, where the approaches are not separate although the closets themselves are separated, and the proper notices on each posted up. These were built prior to the passing of the Act, and can not well be remedied without considerable alterations to the building. I have suggested, where practicable, that the closets of one flat be exclusively used for females and those of another flat for males; this is carried out when it can be done without much inconvenience and loss of time. I must report that it has come to my knowledge that in the city of Ottawa several mercantile establishments where some females are employed during certain seasons of the year to do custom work for the store, and also some printing establishments do not comply with the requirements of clause eleven of the Factory Act; but these not coming under my jurisdiction, I have no authority to interfere. These places should be brought under the control of some person, either through sanitary laws or the Factories' Act, so that some person may be vested with legal authority to compel the employers or the owners of the buildings to provide the necessary closets and otherwise comply with the law.

Two permits to work over-time have been granted; one to the Stormont Cotton Manufactory Co., Cornwall, on a request of March 13th, 1891, and one to Boyd Caldwell's Woollen Manufactory, at Lanark, on a request dated November 25th, 1891. In both cases the notices have been put up and registers of over-time kept.

Accidents.

Eleven accidents have occurred to my knowledge in factories in my district of which two were fatal. Seven of these accidents have been reported to me, and the four others I have been informed of at my visits of inspection.

The fatal accidents are: One in the Toronto Manufacturing Co. of Cornwall, when one Albert Wood, got his arm drawn in super-calender, of which injury he died the following day. The machinery was properly protected and the accident was due to carelessness.

The other fatal accident which occurred at McLaren's Mills in Ottawa, was entirely due to the imprudent attempt of one Smith to put on a belt on a pulley in motion. The belt wound up around the pulley so tightly that it broke and struck Smith, who died the same evening from the injury. The other reported accidents are as follows: Toronto Paper Manufacturing Co., Cornwall, John Fleming, hand crushed in revolving knife of paper cutter; two occurred in J. R. Booth's saw mills, at the Chaudiere, in Ottawa, one boy had his leg broken whilst standing in the mill where he had no business by a piece of lumber shoved against him; and the oiler, going under a shaft, knocked his head against it and was laid up a few days; two accidents occurred at the mill of Wm. Mason & Sons, which were of slight character and not through any machinery, but by their own action and carlessness. Of the four accidents not reported, two happened in Lewis & Cluff's planing and refrigerator factory. These accidents occurred on a small circular-saw and were due to want of experience on the part of the parties running the machinery. One accident occurred in Steele's door and sash factory and planing mill, by which a young man had three fingers cut off by a circular-saw, due to his own neglect to replace the protective covering. The other and last accident was in McLaughlin's mills, Arnprior, where a person was struck by a piece of wood which flew from an edging-saw; he was laid up only a few days.

I have examined the places where these accidents occurred, except four which have been reported to me this month only, and must say in every case except the last, they were due to neglect and want of proper attention to the machinery. In this last case had my suggestions to cover the edger-saws properly been carried out the accident might have been prevented.

In the case of the factory of Lewis & Cluff, in the city of Ottawa, I found and notified one of the proprietors, that the machinery was too crowded, there not being sufficient room between them to allow workmen to move about in safety, and that all shafts and pulleys overhead were too low, and ordered the matter to be properly attended to; but I see by advertisement, that the factory is either closed or to be closed as they offer for sale the machinery, boiler and engine separately.

Fire Extinguishers and Fire-Escapes.

The factories and saw-mills in my district are well provided with necessary fire extinguishers, and I know of no cases where a fire could not be checked at its origin if it happened in daytime during working hours. I have seen a fire starting in a picking-room in the Canada Cotton Factory in Cornwall, just at the time I was inspecting that room, and although it had started with great force it wa extinguished in so short a time by the water power and pumps of the company, that the employés in the adjoining room had no knowledge of the fire. Still, there might be cases, when through accident or unaccountable cause the fire would become general and provision must be made to meet these cases by proper and sufficient exits, to insure the safety of the large number of hands which are

employed in the building. As to the necessity of providing means of escape in case of fire there is therefore no question. What we should consider is the adoption of the best and most efficacious to meet all possible requirements and emergencies.

We have several kinds of fire-escapes on the markets, all having their good points, the best recommended being the iron balconies and stairs placed outside; but this system has also its drawback and dangers; should they not be properly fastened to the walls by bolts running through, they will in time get loose and unable to bear any weight; then again these fire-escapes are generally placed at windows, having the inconveniences very often of an approach encumbered by machinery or other materials. I observed at my last visit of inspection one fire-escape placed at one window where one person only could reach it at a time, having a passage of eighteen inches for at least twenty-five or thirty feet, surrounded by machinery, then there is again the difficulty of opening these windows in case of a panic when several persons are rushing to them, especially during the winter season.

I have no desire to depreciate the outside iron balconies and stairs, as they are the only possible fire-escapes in large cities, but when there is a vacant space around a building I consider that large stair-ways, in different parts of the building, one at least, being in a tower, having fire-proof doors, a better and safer mode of escape, as they are always easier of access and surrounded with less danger and risk, and assure better protection to females, who may be working in upper stories.

I have been informed that inspectors of insurance companies object to such stair-ways as creating draft, but they could be properly closed in, which would remedy this trouble.

Suggestions.

In conclusion, I may be allowed the following suggestions, which if adopted, would in my opinion, render the application of the Act more effective and strengthen the hands of your inspectors to enforce proper compliance with its provisions.

1. That the minimum age be raised to fourteen for boys and fifteen for girls. At that age there would be less possibility of deception by untruthful statements of their age, and that the certificate of age, whenever required, be an affidavit from their parents or guardian that the person seeking employment is over the above age.

2. That no boilers be allowed in buildings where persons other than the one in charge are employed, and all manufacturers using steam powers be compelled to have their boilers insured so as to secure proper inspection by competent persons, certificate of which should be produced to the inspector.

3. That no person be allowed to take charge of engines and boilers unless he obtains a certificate of competency from a board of examiners.

4. If the minimum age is not changed, that no child under fifteen years be employed unless he can read and write, and produce a certificate of having complied with the school laws.

5. That mercantile and printing establishments, where females are employed, should be subjected to inspection as regard the sanitary conditions.

O. A. ROCQUE,
Inspector of Eastern District.

Orleans,
December 31st, 1891.

ACCIDENT REPORT FOR 1891.—WESTERN DISTRICT.

No.	Date.	Employers.	Place.	Person injured.	Age.	Particulars of accident.
1	January 10	Bell Organ & Piano Co	Guelph	Robert Middleton	63	Three ribs broken by going under descending elevator.
2	" 20	" "	"	Wm. Verney	17	Hand crushed by grindstone.
3	" 21	Ontario Cotton Co	Hamilton	Jas. McConnell	31	Hand caught under a card roller on grinding machine, and seriously hurt. No bones broken.
4	March 16	" "	"	Thos. Mason	16	One finger broken and two strained ; caught in draw of mule.
5	May 8	" "	"	Frank Smith	25	Foot scalded by slipping into dye vat.
6	February 5	Augustus Newell, organ reeds	Toronto	Arthur Wright	15	Foot slipped, and was jammed in the elevator.
7	January	John Fletcher, builder	"	——Bendle		One finger cut off by drawing across a circular saw.
8	May 20	" "	"	Wm. Wright	25	Three fingers of left hand taken off by shaper.
9	February 13	Brodie & Co., flannels	Hespeler	Jas. Ross	20	Finger and thumb of left hand caught in wool picker and badly bruised.
10	October 1	" "	"	John Parr		Clearing wool picker, ran a tooth in his elbow ; blood poisoning followed ; idle 9 days.
11	November 23	" "	"	Thos. Cornwell		Two fingers of right hand cut and bruised in burr picker.
12	December 17	" "	"	Maggie McDonald	20	One finger of right hand caught in gear of folding machine and taken off a root of nail.
13	February 23	Parisian Steam Laundry	Toronto	Jennie Vessie	23	Thumb of right hand fractured in gear of ironing machine. She was cleaning it, the wipe rag being wound around her thumb was caught in the gears and drawn in.
14	April 29	" "	"	Mary Ward	20	Right hand and arm hurt and burnt in steam mangle. Caught between the roller and steam cylinder.
15	February 17	M. B. Perrine & Co., twine	Doon (Waterloo Co.)	Fred. Leybourne (fatal)	17	Killed while loading a heavy press on waggon. The press fell on him.
16	February 26	J. S. Ainslie & Bros., staves	Staples (Essex Co.)	Eli Bogrand (fatal)	30	Killed by being caught in small belt which he was trying to place on pulley.
17	" 23	Waterloo Mnf'g. Co., Agr. Imp.	Waterloo	S. N. Beatty		Thumb and two fingers cut off by circular saw.
18	" 27	Keir & Harcourt, bobbins and spools	Walkerton	Geo. Disch	14½	Killed. Boy was sitting in a 5 inch belt which was hanging on a revolving shaft; the belt wound around the shaft.
19	March 9	Malcolm & Souter, furniture	Hamilton	N. Randall	21	Three fingers of left hand cut by a cutter of dado head coming out throwing stick and hand on the knife.
20	" 19	Norton Mnf'g Co., tin cans	"	Wm. Willis	24	Finger pinched and nail destroyed in a power press.
21	April 9	" "	"	Abram Hill	19	First joint forefinger of right hand taken off by power press.
22	" 25	" "	"	Robt. Weston	20	First joint forefinger of right hand taken off by power press.
23	May 7	" "	"	Geo. Miller	24	Bad flesh wound and bones broken in back of left hand. Caught between wrench and fly wheel of power press.
24	August 25	" "	"	Arthur Cliff	14	Ends of two fingers nipped off by power press.
25	September 2	" "	"	Robt. Weston	21	End of third finger nipped off by power press.
26	October 16	" "	"	Robt. Weston	21	Finger caught in power press so as to burst open the flesh.
27	November 24	" "	"	Ernest Poupard	17	First joint of left thumb bruised and torn by power press.
28	February 7	J. Zingsheim, furniture	Hamilton	Walter Britton	17	Part of left thumb off by band saw.

29	March 31	Globe Furniture Co	Walkerville	M. Beasley		Lost first joint of three fingers of right hand by buzz planer.
30	April 7	Ontario Rolling Mills Forging Co	Hamilton	E. Coulmidtry	30	Thumb of right smashed under the hammer.
31	" 2	" Bar Iron Mills	"	Robt. Wilson	20	Toe amputated, having been run over by buggy loaded with iron.
32	July 17	" Forge Mill	"	Hy. Johnson		Back of hand badly cut while working at the shear in forge mill.
33	" 22	" Bar Iron Mill	"	Jos. Dylse		Foot jammed by a weight falling on it, (at night work).
34	April 6	J. F. Ross, tin cans	Toronto	—— Shippar		Part of two fingers of right hand taken off by power press.
35	March 23	Bennet Furnishing Co	London	Hugh Kay		Three fingers of right hand severely cut by shaper; idle two weeks.
36	April 10	John Watson, Boxes	"	Alfred Green	19	Thumb of left hand cut by saw; idle three weeks.
37	March	J. O. Wisner, Sons & Co., agr. implements	Brantford	Samuel Skinman	60	Third and fourth fingers of left hand cut off by circular saw.
38	" 16	J. Inglis & Sons, Machinists	Toronto	Jno. Inglis	28	Part of a finger of left hand cut off by a wood planer.
39	" 19	Jas. Hay & Co., chairs	Woodstock	Wm. Wright	20	Finger of left hand jammed between sand paper disc and frame.
40	November 20	" "	"	Jno. Smithson	72	Little finger of right hand cut badly; stumbled and put his hand on saw.
41	May 14	Barber & Ellis Co	Toronto	Sadie Keech	18	Removing a paper which had become fast in a small printing press, the cylinder, having a heavy side, turned over pressing her right hand against an iron point, which penetrated her right hand.
42	March 3	Bolt and Hinge Works	London	Walter Harris	13½	Wrist dislocated; wearing a mitten it caught on drill point and twisted his arm around.
43	May 19	R. Forbes & Co., Woolens, Lt'd.	Hespeler	D. McNaught	13½	End of first finger caught in feed gears. Lost the nail.
44	" 17	" " "	"	T. Jaglowitzy	14	Cleaning mule between carriage and frame, displaced starting bar enough to start the carriage in and squeeze him against roller beam, injuring his back and wrist.
45	December 17	" " "	"	W. Sharp	13	Carelessly put his hand in worsted gill box calender; lost first joint of finger.
46	May 1	Penman Manufacturing Co	Paris	A. Kuhlman	15	Front part of thighs lacerated, being caught in mule gears.
47		Canada Office and School Furniture Co.	Preston	Jno. Rooke	42	Finger of left hand badly cut by shaper.
48	" 1	S. Taylor & Sons, yarn	Toronto	Mrs. Hanna	25	Right arm caught between elevator platform and floor joist; badly bruised.
49	" 26	Canada Pipe Foundry	Hamilton	Geo. Bolton		Thigh and body badly injured; fell with a car down the hoising shaft, one storey.
50	June 12	Hamilton Bridge Co	"	Samuel Potter		Two fingers and hand caught between roll and plate while straightening iron plates. Badly crushed.
51	May 26	R. Roschman, buttons	Waterloo	Paul Kratz, (fatal)	17	Several fingers of right hand caught between rollers of corn crusher and crushed. He was removing an obstacle while machine was in motion. Died of lock-jaw 14 days after; was thought to be improving.
52	June 16	Allan Mnf'g Laundry Co	Toronto	Rose Heffey	40	Right hand bruised and cut, being caught between rolls of plain clothes ironer; one hour starting time, cylinder was cold.
53	" 16	E. A. Bisnett & Co., lumber	Rowley Mills (Kent Co.)	Jas. Stewart		Hand and breast cut by a piece of a broken saw flying and striking him.
54	May 17	Lincoln Paper Mills	Merritton	Jno. Boyle	21	Hand and face burned. Hand caught between hot dryer and felt, drawing his face against the hot cylinder. Idle six weeks.

ACCIDENTS.—WESTERN DISTRICT.—*Continued.*

No.	Date.	Employers.	Place.	Person injured.	Age.	Particulars of accident.
55	March 17	Whitman & Barnes Manuf'g Co. reaper knives	St. Catharines	Jas. Ruddle	20	Three fingers cut when placing shears in shearing machine. Fingers not permanently injured, idle 4 weeks; wages and doctor's bill paid by Company.
56	May	Wm. Crowie	"	Wilson Patterson	20	Third and fourth fingers cut by circular saw.
57	June 15	"	"	Robert Collings	25	Third finger of right hand badly cut by shaper.
58	January	Walker Sons & Co	Walkerville	Frank Demarais	41	Tips of three fingers cut off by jointer.
59	May	Ideal Manf'g. Co., churns, etc	St. Thomas	—— Davis	22	Left hand cut off at the wrist. He put his hand in the cylinder after the belt was off but machine was still in motion.
60	"	" " "	"	Jno. Law	16	Third finger of left hand in gears of boring machine, and so injured as to require amputation. He is reported as looking one way and reaching out another.
61	June 30	The Riordan Paper Mills, Ltd	Merritton	Lewis Le Froy	.....	Hand injured by grindstone.
62	June	McClary Mn'f Co., stoves and tinware	London	—— Phillips (a boy)	..	Part of first finger of left hand taken off by press.
63	"	" " "	"	—— Palmer	15	Part of three fingers of left hand taken off by press.
64	July	" " "	"	A moulder	.....	Back burned by molten iron, a wet skimmer causing explosion.
65	September 25	" " "	"	Wm. Westhead	50	Engineer. He was using bar to get engine crank over the centre, with steam on, engine started suddenly, before he could withdraw the bar, which struck him, cutting his head and breaking some ribs.
66	November 27	" " "	"	E. Henley	23	All the fingers of right hand taken off by a cutting press.
67	May 4	W. C. Bell, builder	Ingersoll	Jno. Bell	.....	First finger of right hand cut off at second joint by jointer.
68	July 9	Steinhoff & Gordon, staves	Wallaceburg	Geo. Groombridge	.....	First joints of three fingers of right hand cut off by stave cutter.
69	" 11	Harvey Morris	"	Geo. Clark	22	First joint of right thumb cut off by stave cutter.
70	" 5	"	"	Jas. McCrea	20	Part of a nail cut off by stave cutter, idle eight days.
71	August 6	"	"	A man	.....	Tips of two fingers cut off by stave cutter.
72	July 15	Jas. Morrison, brass work	Toronto	Angelo Psyche	21	Three fingers off and left hand crushed in lathe gearing.
73	" 29	London Foundry Co	London	Ernest Williams	17	First finger of left hand cut off at second joint, and two others badly cut by circular saw.
74	August 13	London Machine Tool Co	"	William Angus	18	Fleshy part of two fingers pinched, adjusting dogs on iron planer in motion.
75	July 10	Watson & Malcolm, furniture	Kincardine	Thos. Gardner	25	Pulley on shafting broke and flying pieces struck the ladder he was on, throwing him down, injuring his head and arm. Idle one week.
76	" 16	" "	"	Edward Barnes	16½	Finger jammed between grindstone and frame.
77	June 8	" "	"	Wm. Anderson	30	Piece of wood flying from circular saw struck his hand.

78	July 25	Gilchrist, Green & Co., furniture	Wingham	Jas. Hamilton	18	Large sliver from rip saw penetrated palm of right hand, sticking about a foot through.
79	May 6	Button & Fessant, chairs	"	Jno. Van Camp	30	Part of finger of left hand cut off by circular saw.
80	June	Broadfoot & Box, furniture	Seaforth	M. Campbell	60	Finger cut by rip saw and amputated.
81	August 27	St. Thomas Pipe & Foundry Co	St. Thomas	Alex. Fraser		Leg broken by overbalancing of a flask.
82	" 29	Sykes & Ainley, blankets	Glen Williams	A man		Face and arm burned by explosion in a rag machine.
83	September 2	Thomas Organ Co	Woodstock	Fred. Elton	26	Three fingers of left hand cut off by surface planer.
84	May	Kalbfleisch & Schaeffer, furniture	Tavistock	Jno. Mitchell	17	Two fingers cut by a circular saw.
85	June 5	W. Doherty & Co., organs	Clinton	A man		Thumb and finger, and part of another finger, cut off by rip saw. He was cleaning sawdust away while saw was running
86	October 23	" " "	"	Peter Kerr		Hand between the rollers of sand-papering machine, while oiling; he had thrown off the belt, but the machine had not stopped.
87	June 18	B. Greening Wire Co	Hamilton	J. Forbes	28	Middle finger of left hand crushed by letting wire block drop on it; amputated; idle two and a half weeks.
88	July 21	" "	"	J. Bridges	45	Little finger of right hand caught between wire and drawing block. Broken at second joint.
89	September 18	" "	"	Alfred Jamieson	18	End of middle toe crushed by lever of chain machine, amputated.
90	" 22	McGregor, Gourlay & Co., mch'y	Galt	J. Jeffkins		Fingers caught in crane gearing and badly crushed.
91	" 10	McMackon & Coats, staves	Romney (Kent)	A man	32	Tip of thumb cut off by stave cutter; idle a week.
92	October 7	Victoria Wheel Works, carriage wheels	Galt	J. N. Miller	40	Caught in main shafting and some ribs broken.
93	" 13	Breithaupt Leather Co	Berlin	A man		Hand between two rubber covered rollers and seriously crushed.
94	August 23	Anderson & Co., furniture	Walkerton	R. Bilson	13	Hand in feed rolls of planer and badly hurt.
95	September	R. Truax & Co	"	J. Erdman	28	Finger cut by shaper.
96	June 22	Southampton Mn'fg Co, planing	Southampton	Abel Knechtel	16	Thumb of left hand cut off by shingle saw edger.
97		Port Elgin Brush Co	Port Elgin	A man		Hand badly cut by swing saw.
98	October 10	J. D. Huber & Co., glue, etc	Berlin	Fritz Potem	14½	Left hand caught in cylinder of shoddy picker and so injured as to require amputation above the wrist. Boy reported as larking.
99	October 9	Ontario Tack Co	Hamilton	Thos. Cook	16	First finger of right hand crushed in wire nail machine; amputated.
100	" 21	W. F. A. Scott, planing	Galt	The foreman		Second finger of the right hand caught between connecting rod and eccentric of engine.
101	" 22	Niagara Casket and Coffin Co	Thorold	Jno. McDonald		Thumb and two fingers of right hand and two of the left cut by circular saw, while placing a piece of board over top of saw.
102	November 6	" " "	"	John Bunyan		Right hand smashed to the wrist in rollers of sand-papering machine.
103	December 24	Universal Knitting Co	Toronto	Geo. Leonard	15	Finger caught in gear of knitting machine; crushed and the top amputated.
104	" 23	Central Press Agency, stereotyping	"	W. H. Chadwick		Thumb of right hand partially cut off by lead planer.

ACCIDENTS.—CENTRAL DISTRICT.

No.	Employers.	Place.	Name of person.	Age.	Particulars of accident.
1	Rathbun Co's. lumber yard	Deseronto	George Bulmer (fatal)	.....	Lumber falling off car ; killed instantly.
2	H. & W. J. Crother's biscuit and confectionery factory	Kingston	John Marshand (fatal)	13 11/12	Fell down hoist ; died on third day after accident.
3	Tookey & Greyson's shingle mill.	Sundridge	James L. Turnbull (fatal)	29	Boiler explosion ; lever of safety valve had been "weighted down so as to keep up steam."
4	Kemp Mnfg. Co's. factory	Toronto	Thomas Hayes	16	Point of finger cut off by power press.
5	Toronto Knitting factory.	Toronto	James Cull	14	Arm caught in gear ; flesh wound ; one week off work.
6	Firstbrook Bro's. box factory	Toronto	James Harris	15	Arm caught in rollers, small bone of arm broken.
7	Dudley & Scott's planing mill factory	Toronto	Hector McAllister	16	Matching machine, hand bruised.
8	Kemp Mnfg. Co's. factory	Toronto	John Reynolds	17	Fingers caught under power press; ends of two fingers cut off.
9	Jas. Smart, Mnfg. Co's. works	Brockville	Fred Griffith	14	Finger cut off at first joint, trying to pull string off revolving shaft.
10	J. & J. Taylor's Safe Works	Toronto	James McCrum	56	Hip bone broken, falling two and a half feet off hoist.
11	Hamilton's Carriage factory	Lindsay	James Staples	40	Hand cut off except small finger, on circular saw.
12	J. P. Wagner & Co's. factory	Toronto Junct.	Thomas Rishworth	19	Right eye destroyed, by piece of wood thrown from circular saw.
13	Lovatt's Portable saw mill	Muskoka	William Lovatt	17	Right leg amputated above knee, foot slipped while oiling.
14	C. F. Smith Co's. factory	Belleville	Frank Naylor	.....	Second finger broken "and first and third fingers jammed," power press.
15	Hanover Furniture & Undertaking Co	Hanover	George Becker	30	Thumb of left hand cut off by rip saw.
16	Hanover Furniture & Undertaking Co	Hanover	Henry Mahn	14	Palm of hand torn and bruised, by hand caught in rollers.
17	The Globe File Mnfg. Co's factory	Port Hope	William Milne	15	Middle finger and part of third finger cut off; hand caught between lever bar and grindstone.
18	Nelson Brothers saw mill	Proton Station.	Thomas John Gamble	26	Hand cut off by circular saw.
19	Kemp Mnfg. Co's. factory	Toronto	William Reid	18	Thumb caught under die of power press.
20	Wm. Hamilton's Mnfg. Co's. factory	Peterborough	A. McFarlane	41	Foot crushed by weight falling on it.
21	Wm. Hamilton's Mnfg. Co's. factory	do	James Moon	40	Foot crushed by shaft rolling on it.
22	C. F. Smith Mnfg. Co's. factory	Belleville	Alfred McCaul	.....	Second and third fingers of left hand smashed by power press.
23	C. F. Smith Mnfg. Co's. factory.	do	Edward Weston	.....	Two fingers of right hand crushed by drop press.
24	R. & T. Watson's confectionery factory	Toronto	C. Hall	18	Three fingers badly cut on cocoanut cutting machine.
25	Toronto knitting factory	do	Thomas Foster	14	Hand caught in gear; injury not serious.
26	Harris and Watlon's sash and door factory	Belleville	George F. Kelly	.....	Middle finger cut by circular saw.
27	Geo. Gillies' factory	Gananoque	Arthur Barber	17	Knee cut, foot slipped against band saw; two weeks off work.
28	Imperial Lumber Co's. saw mill.	Warren, Nipissing District	Robert Simpson	50	Back hurt, one finger cut off, and one lacerated; log being rolled on saw carriage threw him on circular saw.

29	Western Lumber Co's. saw mill.	Rat Portage Rainy River Dist	Abe. Bergson	45	Leg broken, by plank thrown from edger (circular saw).
30	Blind River Lumber Co's. mill..	Algoma District	Thomas Graham	22	Third finger of right hand cut off (circular saw).
31	Baker's shingle mill	Gravenhurst Muskoka Dist.	Thomas Warlow	16	Two fingers of right hand cut off by circular saw.
32	Gilmour & Co's. saw mill	Trenton	Joseph Campbell	25	Thigh cut, flesh wound, slipped while raising feed rolls of double edger (circular saws).
33	Kemp Mnfg. Co's. factory.	Toronto	Richard Scott	17	Three finger ends cut off, power press
34	Smart Mnfg. Co's. works	Brockville	Charles Woodcook	26	Left hand crushed between dog and rest of lathe while drilling casting.
35	Hollister & Jewell's saw mill	Garden River, Algoma	William J. Pine	28	Middle finger of left hand cut off at second joint; circular saw.
36	Berry & Co's. woollen mill	Lambton Mills.	Robert Springford	13	Thumb and two fingers crushed in pulley, in motion.
37	Simpson's Toronto knitting factory	Toronto	Perry Cohen	14	Hand bruised; caught in wool duster.
38	Kemp Mnfg. Co's. factory	"	Ernest Tunnucliffe	15	Two fingers cut off by drop press.
39	Rathbun Co's. planing factory..	Deseronto	Charles Oliver	17	Toes of one foot cut off; shoved his foot on knives of planer, while running.
40	Trent Valley Woollen Co.	Campbellford	Millie Keir	20	Flesh on thumb slightly cut, cleaning machine while in motion.
41	Hollister & Jewell's saw mill	Garden River, Algoma Dist.	Paul Lesage	26	Thumb of left hand cut on circular saw.
42	Standard Woollen Co's. mill	Toronto	C. Lepper	15	Finger caught in gear of picker; cut off at first joint.
43	Jas. Smart Mnfr. Co's. works ..	Brockville	Michael Casselman	31	Foot burned, molten iron.
44	Ontario Rolling Mills Co	Swansea	George Pearson		Head hurt by tackle falling on him.
45	Rathbun Co's. sash factory	Deseronto	James M. Smith	32	Part of thumb cut off on shaper.
46	Kemp Mnfg. Co's. factory	Toronto	Hugh Thomson.	17	Three fingers of left hand cut off at first joint; power press.
47	Tanner Brothers saw mill	Sturgeon Bay..	William H. Kinch	32	Thumb cut on circular saw; one week off work.
48	Victoria Harbor Lumber Co's. mill	Victoria Harbor	Isaac S. Wardell	48	Hand broken, caught in spokes of pulley.
49	Simpson's Toronto knitting factory	Toronto	James Kellett	14	Finger lacerated in gear of carder.
50	Kemp Mnfg Co's. factory	Toronto	Joseph Kenney	18	Finger caught under die of power press.
51	Ontario Rolling Mills	Swansea	W. Young		Hand cut, big shears.
52	Thompson Paper Mills	Co. Addington.	George Shane	40	Part of finger and thumb cut off on rag cutter.
53	Geo Gillies factory	Gananoque	Edward Hall	28	Thumb crushed by drop hammer.
54	C. F. Smith's Co's. factory	Belleville	Clare Sanford	17	Third finger of left hand smashed on drop press.
55	James Smart Mnfg. Co's. works.	Brockville	Henry Buell	18	Three toes bruised. Pulley slipped off drill table.
56	Edison General Electric Co's. factory	Peterborough	J. Cooney		Back of hand cut by pot canting over.
57	Edison General Electric Co's. factory	"	Henry Mein	21	Wrist badly wrenched and slightly bruised; hand caught in pulley while oiling machinery.
58	Toronto Furnace Co	Toronto	William Rowan		Thumb jammed in gear of crane.
59	Craig & Austin's saw mill	Kinmount	Thomas Train	19	Third and fourth fingers of right hand cut off on circular saw (shingle jointer).
60	Edison General Electric Co's. factory	Peterborough	W. Gillespie	21	Left shoulder bruised, left hand cut, thigh and ankle bruised slightly by braiding machine falling on him.
61	Berry & Co's. woollen mill	Lambton Mills.	Edgar Liddle	14	Top of middle finger of left hand cut off; hand caught in revolving pulley.
62	Standard woollen mills	Toronto	Andrew Dudgeon	13	Two fingers of left hand cut off in picker gear.
63	Jas. Smart Mnfg. Co's. works	Brockville	James Kneen	18	First finger of right hand bruised in punching machine.
64	Brease's saw mill	Ullswater, Muskoka	William Graham	17	Arm broken; caught on shaft of carrier.

ACCIDENTS.—CENTRAL DISTRICT.—*Continued.*

No.	Employers.	Place.	Name of person.	Age.	Particulars of accident.
65	Edison General Electric Co's. works	Peterborough	W. C. Hockridge	45	Back bruised and heel bone fractured; staging on which he was working gave away.
66	Edison General Electric Co's. works	"	James Bourne	55	Hip bruised and ankle badly sprained; staging gave away.
67	Jas. Smart Mnfg. Co.	Brockville	Joseph Maisy	30	Four fingers of left hand cut off in gear of tumbling mill.
68	"	"	Robert Stewart	18	Thumb injured; hand caught between head of lathe and screw on which he was working.
69	Terra Cotta Works	Deseronto	Joseph Leronge	30	Three half toes taken off in crushing machine.
70	Dominion Organ & Piano Co's. factory	Bowmanville	Henry Walker	42	Skull fractured by block of wood thrown from circular saw.
71	Rathbun Co's. sash and door factory	Deseronto	Isaac Allum	66	Wrist cut on circular saw.
72	Edison General Electric Co's. works	Peterborough	Mary McMahon	19	Forefinger of right hand badly bruised between revolving bobbins.
73	Rathbun Co's. saw mill	Campbellford	James Doxee	30	Fingers badly cut and bruised; hand drawn between friction wheels.
74	Simpson's Toronto Knitting factory	Toronto	George Cracknell	17	Head cut, arm caught on belt.
75	Christie, Brown & Co's. biscuit factory	"	Henry Barlow	16	Tip of middle finger of left hand cut off, between crank and block. Crank only runs about five revolutions per minute.
76	Toronto Furnace Co's. works	"	W. Sindrey		Parts of body burned by molten iron. Bottom of bull ladle burnt through.
	" "	"	J. Ravell		" " " "
	" "	"	J. Moore		" " " "
	Toronto Furnace Co's. works	"	J. Carson		" " " "
77	Curran & McAdams saw mill	South River Parry Sound dist	Foster Haukley	14	One finger cut off and hand badly cut, by circular saw.
78	Tookey & Greyson's shingle mill.	Sundridge(Parry Sound Dist.)	George Bryce.	36	Scalded on legs; boiler explosion.
	" "		William Cassidy	60	Two ribs broken, knee hurt, bone of hand broken and hand cut; boiler explosion.
	" "	"	William Gammon	22	Slightly scalded and bruised; boiler explosion.
	" "	"	William Creasor	20	Slightly scalded on back of head "
	" "	"	James Fleming		" " " "
79	Globe File Mnfg. Co's. works	Port Hope	Emerson Johns	40	Finger caught on gears (slight).
80	Wm Cane & Sons Mnfg. Co's. works	Newmarket	Fred Hughes	17	Hands cut on matching machine.
81	Edison General Electric Co's. works	Peterborough	Edward Payton	20	Leg cut, by barrel falling on it.
82	J. C. Scott's planing mill	Toronto	William Jennings	40	Point of finger on left hand cut off on buzz planer.

TENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH

OF ONTARIO,

BEING FOR THE YEAR

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

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TENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

To Sir Alexander Campbell, K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honor :

In presenting the Tenth Annual Report of the Provincial Board of Health, it is pleasing to note that during the past year the Province has been singularly free from outbreaks of contagious disease. Diphtheria it is true still continues to claim many victims, especially among children. As this Board has previously had occasion to remark, there is no single cause which contributes so largely to the dissemination and continuance of this pest as the introduction of its contagion into the school-room. Thorough and frequent cleansing of school-rooms, together with efficient ventilation and good heating, would act very powerfully in removing this source of contagion. It is also very desirable that the establishment by Local Boards of Health of isolation hospitals for the treatment of this disease should receive a great impetus. Removing the infectious from the healthy prevents them from becoming fresh centres of contagion, and this, together with the necessary disinfection of exposed articles and the discovery of the cause of the outbreak, places the sanitary authorities in a position to prevent its further dissemination. Now that all outbreaks of diphtheria must, by Order in Council, be reported to the Provincial Board of Health, we are placed in a better position to assist the municipal authorities in applying the proper remedies.

The tracing of typhoid fever to the use of potable water polluted with excreta is undisputed. So true is this that a wholesome water supply will practically banish this disease from a city. But when, on the other hand, a city draws water from a lake into which its crude sewage is discharged, there is danger that at times the water will become impure. Bacteriological examination of Lake Ontario water close to the Toronto water-works intake proves that, according to the direction of the wind, sewage-tainted water with a very slight diminution of the bacteria, can be transported a considerable dis-

tance. Mere dilution of sewage will therefore prove insufficient. The city sewage should be intercepted and treated at the outfall so as so produce an effluent, which being free from bacteria could be safely discharged into the lake. The special germs of typhoid fever being thus destroyed its reintroduction by means of the water supply would be prevented.

The diseases of animals, such as tuberculosis, anthrax, and actinomycosis, have received considerable attention in the laboratory of the Board during the past year, and a reference to our Secretary's report will convince the reader that prompt and thorough extinction of these diseases is of great importance to the well being of many lucrative and useful industries.

A wholesome water supply being a prime necessary of good health. and contamination of potable water from various causes being unfortunately but too common, it is satisfactory to know that by the use of some of the most modern artificial systems of water filtration an inferior can be converted into a first class water. Some of these have for several years been in operation in several cities of the United States. At St. Thomas three Hyatt filters with a filtering capacity of 1,500,000 gallons are now in operation. A bacteriological examination of the St. Thomas water made by the officials of this Board, both before and after filtration, shows a very high degree of efficiency in these filters.

The municipal councils of this Province have not neglected that provision of the Ontario Health Act, which calls for the appointment every year of Local Boards of Health. There are at present 531 Local Boards of Health, and of these 332 have appointed Medical Health Officers.

This Province is fortunate in possessing so many estimable and useful citizens who, without fee or reward, other than that of an approving conscience, devote themselves to the greater good of their neighbors, and the extension to all of some of the best blessings of civilisation. Modern sanitation, however, is rapidly leaving uncertain and debatable ground, and in the hands of skilled Medical Health Officers is pointing with precision to known and removable causes of disease; and we observe with sincere pleasure that medical men of high attainments are thus enabled through the appreciation of an intelligent public to devote themselves almost entirely to the practice of preventive medicine.

Trusting that with the onward march of medical science and the diffusion of sanitary knowledge among the people an enlightened sentiment in regard to the true methods of preventing contagious diseases, and greater energy in removing the recognised conditions which favour their spread, may grow and still further develop amongst us,

I have the honour to remain,

Your obedient servant,

J. J. CASSIDY.

PART I.

REPORT OF THE SECRETARY.

CHAPTER I.

A HUNDRED YEARS OF SANITATION IN ONTARIO.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN.—It gives me pleasure to recall to your recollection the fact that the year 1891 completes the first decade of this Board's existence, and ten years of the first permanent governmental organization for dealing with health matters of provincial interest and extent in Ontario.

This year likewise completes one hundred years of organized government in the Province of Ontario, or Upper Canada, and it may not be without interest that a survey of the century be made, and that something of a comparison be instituted between the health conditions of the last decade and of those which have preceded it.

When Governor Simcoe, with his executive councillors, passed westward from Kingston to establish law and government in the newly created Province, settlement can be said to have existed in little more than name. Though Kingston and Newark had been settled they held few others than soldiers of the garrisons. Whatever settlers had come into the country were from the lately rebellious States, and their views on the subject of Medicine were doubtless those prevailing at the time in the United States.

Then was the period "of systems of medicine, wrought out by the imaginations of some few of the great leaders of our profession." The systems of Boërhave of Leyden, Cullen and Brown of Edinburgh, and Darwin of England, had each had their day, only to be succeeded in the United States by that of Benjamin Rush, a revolutionary and signer of the Declaration of Independence, a member of Congress, and Professor of Chemistry in the University of Pennsylvania. He it was who said "that the time must and will come when, in addition to the above remedies, viz., air, light and water, which are used by all without a physician's advice, the general use of calomel, jalap and the lancet shall be considered among the most essential articles of the knowledge and rights of man;" and of whom his political colleague, Thomas Jefferson, said in writing to a medical friend in 1807: "We have seen the fashions of Hoffman, Boërhave, Stahl, Cullen and Brown, succeed one another like the shifting figures of the magic lantern: and their fancies like the dresses of the annual doll-babies from Paris, becoming from their novelty, the vogue of the day, and yielding to the next novelty in ephemeral favour."

With the establishment of government and society, having an especially English form and fashion, the early physicians of prominence in Upper Canada brought their views from the schools especially of London and Edinburgh*. In the few medical names

*Strange as it may appear to the present medical profession a Medical Board for examining and licensing practitioners in Upper Canada existed as early as 1815, and in 1832 the only persons entitled to practice without such examinations were licentiates of the Royal College of Surgeons of London.

coming down to us we find those who may be said to have grown up with the theories developed during the so-called "epoch of observation" in Medicine, made famous by the great teachers of the French school, Andral, Louis and Chomel. This era beginning with 1830, saw in England, at a period when Canada was in the throes of a political rebellion, the elements of modern Medicine taking form, though as will be seen later on, very practical views were held in some quarters with regard to what sanitation meant on its preventive side.

In 1832, Edwin Chadwick, an English lawyer and writer on economic questions, was made secretary to a Commission of Enquiry into the poor law system of that country, and in 1838 he persuaded the Poor Law Board to make an enquiry into an outbreak of typhus fever in the Whitechapel district of London. The publication of this first sanitary report created a sensation in London; while the same year was made further notable by the appointment of the late Dr. William Farr as the first Registrar-General of births, marriages and deaths.

In Upper Canada at this time the medical profession was in an unusually advanced state, there existing a Medical Board, with power to examine new-comers into the Province, and grant licenses to practice. Its views on medical practice, as also the powers it exercised, partook largely of the autocratic methods in vogue in other legislative matters of the time. There may be found in one of the old newspapers of the time, a letter. complaining loudly of the fact that the licentiates of the Royal College of Surgeons, London, were the only persons entitled to practice without a previous examination by the Medical Board; and the complaint was the more well-founded from the fact that while these surgeons were entitled to practice both medicine and midwifery, they were empowered to examine licentiates from Dublin, from the Apothecaries' Hall, London, and from Edinburgh University, who were already licensed in medicine and midwifery.

Strange as it may seem, the exigencies of the colony had already called into existence laws for protecting the public health. As will be seen later on in a review of the public health Acts of the Provinces of Upper and Lower Canada, the emigration which came in by way of the St. Lawrence had created an ever present danger to the health of the colony. The long ocean passage, principally by sailing vessels, and the wretched condition of many of the immigrants, occasioned the frequent introduction of pestilential diseases, amongst which typhus, or ship-fever, and cholera were the most common.

This is illustrated in the Report to the Legislature of the York (Toronto) Hospital and Dispensary, dated York, Nov. 19th, 1832, which is as follows:—

The great increase in the population of this town and its vicinity, and the misery and wretchedness of the lower classes of emigrants could not fail to disseminate amongst them disease in its various forms. . . . Typhus fever, in its most malignant form raged to a most alarming extent; many of the fatal cases above reported upon have been of this malady brought into hospitals from the steamboats or from the confined and filthy parts of the town. . . . It is worthy of remark that most of the lower orders have such an aversion to an hospital, that they will not submit to be removed until they are conveyed hither in a state of insensibility.

(Signed) C. WIDMER, Surgeon.
P. DIEHL, Surgeon.
JOHN KING, M.D.
JOHN ROLPH, Surgeon.

The hospital register gave the following:—

Acute disease	408
Surgical	83
Chronic, medical	74
Adults and children received aid and medicine at dispensary	2,100
Removed, last return	17
Since admitted	548
Discharged, cured	437
Relieved	8
For surgery	1
Died	61
Remaining	58

In this same year cholera was introduced into Canada by way of the St. Lawrence; and though it disappeared in the early autumn, its ravages were of an extended and most fatal description. It was a mysterious disease to the medical profession in Canada, and here, as elsewhere, the knowledge of its causation and method of propagation were the subject of constant speculation. Many supposed that winds of some peculiar and special character spread the disease from country to country, and the reports which had reached Canada of its westward march from India in 1827 to Russia in 1829 and later to Britain had created serious misgivings lest it should be transported to these western shores. To the end of preparing for such a contingency the Canadian Executive of Lower Canada published in October, 1831, a communication on the subject of cholera transmitted from the Colonial office in London. On its receipt a conference of physicians was called in Quebec to discuss the matter, with the result that the Government despatched M. Dr. Tessier to New York to there study the measures being adopted against the introduction of the disease.

The first Sanitary Commission instituted in Canada to deal with cholera was appointed in Quebec in February 1832, and was composed of Drs. Morrin, Parent and Perrault, and some months later a Board of Health was organized which adopted some quarantine and other regulations.

Though not appearing in epidemic form till June, the first cases of cholera arrived in the St. Lawrence on April 28th, 1832, and were landed at Grosse Isle from the ship. *Constantia*, from Limerick, having 170 emigrants of whom 29 had died on the voyage.

On May 14th, the ship *Robert* from Cork arrived and had 10 deaths on the voyage.

On May 28th the ship *Elizabeth* from Dublin arrived with 145 emigrants and 42 deaths.

But the weather by June had grown warmer, and on June 3rd the ship *Carrick* from Dublin arrived having had 145 emigrants of whom 42 had died on the voyage.

This may be said to have been the beginning of the epidemic in Canada. The Grosse Isle station, having only been opened that spring, there were no conveniences, and no proper quarantine precautions. All who seemed well were allowed to pass up the St. Lawrence, disinfection was unknown, and hence all the soiled clothing of the emigrants was forwarded unwashed. Further there was constant intercourse between sailing and steam vessels westward to Montreal. It ascended the Richelieu and thence reached Lake Champlain and the Hudson.

By June 10th the disease had reached Montreal and spread rapidly to different parts of Lower and Upper Canada. It had disappeared by the middle of October, having lasted four months.

The discontent and famine in Ireland had caused an extensive emigration to American shores, and by September nearly 30,000 emigrants had come up the St. Lawrence.

Deaths amongst these people were so common from every cause, that no very special record was kept of those from cholera; but it is stated that in Quebec there occurred during this fatal summer 2,208 deaths from cholera alone, and that in Montreal 800 deaths occurred in the first fortnight and by September 1,843 had been slain by the disease.

In this brief history we have seen that some idea had been obtained of the necessity for preventing the introduction of cholera by establishing quarantine; but the results make apparent the ignorance of what was necessary to be done to attain such an end.

Returning, however, to Upper Canada it will be seen that the epidemic of 1832 soon passed westward from Montreal appearing in Prescott on June 14th. That the colony was greatly agitated at the advent of this mysterious plague is seen from the following letters found in the Journals of the Legislative Assembly of 1833; while the circular of the Lieutenant-Governor and the Order in Council are most interesting as showing the intelligent appreciation of the public danger, and of the prompt action taken to do all which the knowledge of the time made possible, for the limitation of the disease.

The following letter is dated Kingston June 14th, 1832, and is given along with a statement of sums advanced by authority of the Lieut-Governor and spent in preserving the health of the Province during the prevalence of cholera.

I beg to transmit for the information of His Excellency the Lieut-Governor a copy of the proceedings of a public meeting of the inhabitants of Kingston, held this day, with the resolutions that have been unanimously adopted. . . . As certain intelligence has been received that the disease called Asiatic Sporadic Cholera has appeared both at Quebec and Montreal, the committee of management appointed at this day's meeting are anxious to proceed with vigour, and without delay in carrying into effect such measures of prevention and relief as may be judged most necessary.

And at their request, I beg to inquire whether His Excellency has any fund at his disposal with which it will be in his power to aid the committee in the prosecution of their charitable intentions; whether, in this case of peculiar emergency, His Excellency would feel authorized to place at the disposal of the committee any sum, although there should be no specific fund to meet such calls.

May I beg on behalf of the committee to be informed of His Excellency's pleasure at the earliest convenience.

I have, etc.,

(Signed) ROBERT D. CARTWRIGHT.

Edward McMahon, Esquire, etc., etc., etc.

(A copy)
William Rowan.

The following is a letter from Prescott of the same period :—

Prescott, June 16th, 1832.

I have the painful duty of informing you, for the information of His Excellency the Lieutenant-Governor, that the cholera has broken out in this place. There have been three cases since 12 o'clock this day. A number of persons, boatmen and others, have died of the same disease within the last two days (say the 15th and 16th instant) between this and Cornwall. A number more have died between Cornwall and Montreal. I speak of boatmen, emigrants and sailors. Many of the boats on their way up have been deserted by their crews. There are a number of boats within a few miles of this place laden with emigrants who are as yet in a healthy state. All is consternation here.

Will not His Excellency immediately send us some assistance? We have no funds at our disposal. The port being almost the only one where the emigrants are landed from the Durham boats and Batteaux, and reshipped on board of steamboats for the different ports on Lake Ontario, renders it necessary that the utmost vigilance should be used to prevent its spread if possible. I again ask will His Excellency not send some efficient person to our assistance, clothed with the necessary authority to supply funds, and to enforce the necessary rules and regulations.

I refer you to Dr. Scott's letter to Dr. Widmer on the subject.

And I am, etc.,

(Signed) A. JONES.

The following is His Excellency's reply :—

Government House, York, 19th June, 1832.

Sir,—With reference to your communication of the 16th instant, I am directed by the Lieutenant-Governor to acquaint you that His Excellency will arrange with the bank to place five hundred pounds at the disposal of yourself and Mr. Patton, to be employed in any way you may think beneficial to the community. His Excellency begs of you to call to your aid the magistrates and respectable persons of your neighbourhood to form boards of health, and to request that the magistrates will assume all authority that may be necessary on the occasion.

I have, etc.,

(Signed) E. McMAHON.

Alphæus Jones, Esq.,
Prescott.

(A copy.)
William Rowan.

The following is a circular addressed by the Government to the Chairman of the Quarter Sessions of the several districts on the breaking out of the cholera, dated 20th June, 1832 :—

Sir,—The contagious disease which has extended its ravages to Lower Canada, having appeared at Prescott in this Province, it becomes necessary to take immediate precautionary measures for arresting its progress, as far as human means can avail. I am, therefore to aquaint you, by command of the Lieutenant-Governor, that His Excellency, in the full confidence that the legislature will sanction the adoption of any measures which the present exigency may require, requests that you will convene the magistrates of the district, and with their aid form a Board of Health.

With the advice of the Executive Council, His Excellency directs that the Board shall assume the authority of enforcing such arrangements as a due regard to the preservation of health may require, and

places at the disposal of the magistrates in each district the sum of £500, to defray the expense of the disbursements that may become necessary for providing hospitals and medical attendence, and for making the arrangements that the medical board of each district, to be formed at the request of the Board of Health, may suggest.

I am also to state, that the chairman of the Quarter Sessions of each district will be furnished from this office with any printed instructions or recommendations which it may be advisable to transmit, and to request that the magistrates may be earnestly enjoined to forward regularly such statements of their disbursements as will enable the executive government to account satisfactorily in detail for whatever moneys they may find it necessary to expend.

The District of Ottawa and the District of London are apparently little exposed to danger of infection, but His Excellency confides in the discretion of the magistrates of those districts to make no unnecessary disbursements.

I have, etc.,

(Signed) E. McMAHON.

(A copy.)
WILLIAM ROWAN.

In the Journals of the House of Assembly, 1833, is a report of a Select Committee on Cholera Accounts, of the total amount (advanced by His Excellency to the several districts of the Province, there being eleven in all) of £4,139 19s. 0½d. expended.

The purposes to which the above several sums of money have been applied are various, but two of the principal items of expenditure are for the erecting and maintaining hospitals, and fees to medical gentlemen for attending cholera patients. The latter charge exceeds £700.

It is only doing justice to the medical gentlemen of the Midland and Home districts, where the epidemic raged with great violence, to state, that they have received no pecuniary remuneration whatever from public funds for their arduous services.

The report states that much good was effected by the aid of private subscriptions in every part of the Province, but in one instance only is the amount stated, this being the Town of Kingston, where the sum of £223 14s. 5d. was paid by individuals towards alleviating the general calamity.

The report further states the appreciation held of His Excellency the Lieutenant-Governor (Sir John Colborne, K.C.B.) for the promptitude with which, on his own personal responsibility, and not from the public funds, he provided means to arrest the ravages of a disease whose mysterious course and fatal effects, for a season, spread desolation and dismay throughout a large portion of the inhabited part of our happy Province.

The report is signed,

H. C. THOMPSON,
Chairman.

That the Province was alive to the danger of the return of cholera is learned from the fact of an Act being passed by the legislature 13th February, 1833 (whose provisions will be referred to later), entitled "An Act to establish Boards of Health, and to guard against the introduction of malignant, contagious and infectious disease in this Province, and for the formation of local boards" in 1833, as learned from the *Courier of Upper Canada*, in which the following is published referring to an advertisement therein. Under this Act a local board was formed in York, whose organization was published in the newspapers of the time. Regarding this advertisement the *Courier of Upper Canada*, of date April 17th, makes the following remarks :—

APRIL 17th, 1833.

"BOARD OF HEALTH.—We are happy to learn that His Excellency the Lieutenant-Governor has constituted a Board of Health for this town and neighbourhood, for the purpose of watching over the state of the public health and of making such preventive measures as may appear expedient. There are undoubtedly many local nuisances which require these gentlemen's immediate attention, and which, if not removed, must infallibly prove the fertile source of disease of some kind or another. In Terauley street there are large pools of water, covered with decomposed vegetable matter, which already send forth the most noxious and poisonous exhalations; and many other parts of the town exhibit similar nuisances. The following gentlemen constitute the Board of Health :—Grant Powell, Esq ; President, Jas. Fitzgibbon, Esq. ; Secretary, Robert Staunton, Esq. ; Dr. King ; Dr. Gwynne ; Wm. Gamble, Esq. ; Jas. F. Smith, Esq. ; M. T. Carfrae, Esq. ; R. Cathcart, Esq.

☞Mr. Carfrae has declined to accept the appointment.

Not the least curious in this extract is the note, which beautifully illustrates the attitude which too many even to-day take when asked to act on our local boards.

As those of us of the present generation know nothing of cholera, except as telegraphic reports bring us news of its ravages in far off India and Persia, or occasionally from the shores of the Mediterranean, it is of interest to learn something of the ravages it has been capable of creating even in this northern climate during the warm weather of summer,

which alone makes its ravages possible. We have already seen how it was introduced in 1832, and the prompt measures taken by the then Lieutenant-Governor.

Its next appearance in serious proportions was in 1849, and regarding this epidemic in this Province the newspapers of the time give very full accounts. In these it is most curious to note how, as in more recent times, local commercial interests have minimized the dangers with the result of creating at a later stage evils of an extent impossible had prompt measures at the outset been taken for its limitation.

At this time, as even in later times, the doctrine was taught by many that cholera was not contagious. Thus it was stated, "It is no doubt true that when one person takes the cholera another may take it. The atmospheric conditions which produce the one may produce the other. But as to any direct communicability of air from one person to another it is no more likely in the case of cholera than in the case of a broken leg." This was the doctrine taught in November, 1848.

Cholera had then, in October, reached England *via* Hamburg in the person of sailors, which resulted in the City of London voting an allowance for its first medical health officer, Dr. Sutherland, at £500 per annum, to superintend the health of the metropolis and for recommending means for the public safety. The Government sent Drs. Grainger and Ayres to Hamburg to investigate the disease; and in November 4th the General Board of Health notified the public of the recent Act for the removal of nuisances and the prevention of diseases.

On June 1st, 1849, *The British American Journal* said: "Cholera has appeared in New York, Cincinnati and Chicago, and the Bill (of Parliament of Canada) for preserving the public health has received the sanction of law.. A great deal requires to be done, and this is not the time for doing it, when the disease has broken out and is daily numbering its victims. Let the Board of Health issue their directions. Let the cities be cleaned and this one particularly, for we believe it requires it more, and if the cholera arrives we will be prepared for it. . . . Two cases of sporadic cholera, presenting a number of the features of the Algide variety, and terminating fatally, the one in twenty-four hours and the other in eight hours, have occurred during the last week in Montreal. . . . . Cases of a similar description occurred in anticipation of the epidemic in 1832. We hope our authorities will profit by the warning."

How such warnings were heeded in Toronto is admirably illustrated by the following report of the doings of the city council from the *Globe* of June 21st:—

"There was a special meeting of the city fathers to take into consideration a subject of grave importance to the citizens of Toronto at the present time,—the appointment of a Board of Health."

A heated discussion took place regarding the injustice of the Bill which forced municipalities to form Local Boards to do the work according to the instructions of the Central Board, and then bear the expenses besides.

Alderman Workman (Dr. J. Workman) said: "This is not the time to discuss the Public Health Bill, but he thought it was on the whole a good Bill, the system of a Central Board was the best plan that could be adopted. Alderman Workman concluded by recommending the re-appointment of the present Board of Health."

On June 27th the *Globe* again stated: "The General Board of Health published its regulations from its office in Montreal on June 14th, 1849," These were signed by A. H David, M.D., Secretary, and consisted of 24 sections, and approved of by the Governor in Council, Lord Elgin, on the 15th day of June, 1849, signed by the Secretary of Council, J. Leslie, Esq.

On July 12th, cholera was reported present in Toronto. The *Globe* of Saturday the 14th July, says: "The malady has appeared in our midst, but not to an alarming extent. We believe the best way is in all cases to tell the truth, the whole truth and nothing but the truth.

"As far as we have been able to learn the first case occurred on Friday of last week

(July 6th), and during the intermediate days the following are believed to be an accurate report of the cases which have occurred.

	Cases.	Deaths.
On Scott street, 1 resident; 4 emigrants	5	2
On King street east, an emigrant	1	1
On March street, an emigrant family	5	3
On Queen street west, a carter	1	1
In Hospital, all emigrants	3	3
Emigrant shed	1	0
	16	10

"A cholera hospital will be opened to-day, and thanks to the activity of the Mayor every necessary precaution is being taken which the circumstances permit of."

On July 19th, Thursday, the same paper says: "There is some difference of opinion amongst the medical men whether Asiatic cholera is amongst us. Still the deaths are numerous whatever the disease."

On Wednesday, 8 a.m., the total number of new cases in the last 24 hours was 13, those previously reported being 66.

About this time Dr. Gavin Russell, Montreal, published a pamphlet "on the operation of physical agencies in the functions of organized bodies with suggestions as to the nature of cholera." His theory was that cholera is entirely occasioned by the absence or deficiency of electricity. Commenting on which the *Globe's* sanitary editor sagely remarks, "It is a fact that thundery weather hinders butter making by causing an escape of electricity from the milk, and the same cause prevents the working of the electric telegraph."

As illustrating the changes in the newspaper barometer we quote the following from the *Globe* of July 26th, its heading is: "The Cholera —National Humiliation."

"Whatever be the natural causes employed to produce the disease, it must be regarded by every reflecting mind, as a scourge sent from the Almighty and having in it a voice calling loudly for humiliation and deep thought."

The extent and conditions attending this most serious outbreak, were several years ago set forth in the records published in the Ontario Health Bulletin, 1884, and found at the end of this chapter, but the notes from various sources will be found of interest.

On July 24th the *Globe* gives the cases of cholera for the two previous days as 35 cases and 18 deaths. The next paragraph of news says: "Col. Alvah Mann's New York Broadway circus performed in this city on Friday and Saturday to crowded audiences."

The same issue of *Globe* says that the Local Board has issued a proclamation that all persons keeping pigs within the city and liberties will be fined £5.

A special order of July 25th of Central Board required local boards to have houses vacated when neglect to cleanse and crowding prevails.

The Local Board of London is recorded as having prohibited the sale of vegetable matters within the town during the prevalence of cholera.

Dr. Derry in charge of Toronto cholera hospital is referred to early in August as having resigned, his salary of $5 per diem being in his opinion wholly inadequate for the sacrifices of his private practice.

The Quebec *Mercury* has the following curious note. "Hearses and funeral carriages ply for hire in the streets of that city: a man has been seen standing with his death-carriage horsed and ready for use, the animal munching his oats and the driver on the look out for a fare."

On August 7th the Local Board of Montreal passed an order prohibiting all equestrian performances, concerts, etc., during the prevalence of the cholera.

A writer of the time in Paris correspondence makes the statement that 8,000-10,000 died in Paris within a fortnight.

August 15th. The cases in Toronto reported to date 414, deaths 254.

August 16th. A newspaper note refers to the capture of Dr. Rolph's horse on the street at night, standing in front of a house while the Doctor was visiting a patient, by a city policeman, under an order of council prohibiting horses standing on streets at night. The Doctor had to pay 1s. 10½d. to get him out of the city pound. Complaints of imperfect records by the Board were frequently made and refuted about this time.

Montreal papers, August 24th, report a ship at Grosse Isle with typhus, 30 deaths in voyage and as many more cases landed.

In London, England, at this time cholera increased rapidly. In the last of August, 1,276 deaths occurred in a week.

The cholera was abating in Montreal by Sept. 5th. Sept 11th the Toronto *Globe* states, we have still a few cases of cholera in the city. To date there have been 745 cases and 449 deaths.

By Sept. 22nd cholera had disappeared from Quebec, there having been 1,047 deaths there during the epidemic.

The deaths in New York per 1,000 in the three epidemics are given below:

1832, 15.7 per 1,000; 1834, 3.6 per 1,000; 1849, 11.35 per 1,000.

I have already referred to the criticisims by the Toronto Council of the Act providing for the establishment of a Central Board of Health, passed by the Parliament of the United Canadas in April, 1849. Its provisions are those in many instances which are contained in the consolidated Public Health Act of 1887.

It provided that wherever the Province or any part thereof is seriously threatened with an outbreak of any contagious disease, the Governor may by proclamation declare the Act to be in force in the whole Province or in any part thereof. It was an amendment to the Act passed in the 5th year of William the Fourth.

Under this Act the Governor could, by commission, appoint a Central Board of Health.

Sect. IV empowers the Central Board to require the Mayor, Reeve, etc., of any municipality to call special meetings and appoint a Local Board of Health. If, after petition of ten or more ratepayers stating that such council has refused to make such appointment, it shall be lawful for His Excellency in Council forthwith to appoint not less than three persons to be called "The Local Board of Health."

Sect. V.—Provided that any three or more members of the Central Board could issue such regulations as they deemed proper for the prevention or mitigation as far as possible of such epidemic or contagious disease, and said Board could authorize and require the Local Board to superintend and see to the execution of the said regulations for dispensing medicines and for affording aid to the affected and to those threatened. Local Boards were further empowered to remove the sick from any unhealthy dwelling to tents, etc.

Sect, VI.—Provided for two or more Health Officers entering at all reasonable times on premises, and if necessary calling to their aid constables to enforce removals therefrom.

Sec. VII.—Provided that the expenses of the Central Board be defrayed out of moneys voted by the Provincial Parliament for this purpose, and the expenses of Local Boards to be defrayed by the municipality.

Sec. VIII—During the period while the proclamation was in force all municipal health regulations were suspended.

Sec. IX.—Provided a penalty of £5 for violation of the regulations.

Sec. X.—Provided that no order nor any other proceeding, matter or thing done or transacted in, or relating to the execution of this Act shall be vacated, quashed or set aside for want of form, or be removed or revocable by *certiorari* or other writ or provision whatsoever into any of the Superior Courts in this Province.

With the advent of the autumn, cholera disappeared from the Province and did not reappear until 1854, its prevalence along the valley of the Mississippi and in Great Britain in 1848, made its re-appearance in 1849 to be feared, and the Province seems to have been fairly well prepared for it.

A proclamation establishing under the Act of 1849 a central Board of Health, is dated Quebec, 20th July, 1854, declaring said Act of 1849 to be in force in the Province, and to continue in force for and during the period of six calendar months. Signed *Elgin* and *Kincardine*.

Under it the Central Board issued Regulations dated at Quebec, 20th July.

They were contained in two chapters:—

Chapter I. contained general and personal directions to families and individuals and treated of (1) cleaning of premises, (2) keeping cellars clean and dry, (3) houses to be aired by chimney boards and stoppers being removed, (4) doors to be left open day and night, (5) bedding to be aired daily, (6) personal cleanliness by tepid bath two or three times weekly, (7) flannel vests to be worn next to skin, (8) general moderation in eating and drinking, diet light and nourishing, mainly of animal food, while fish and vegetables were to be used sparingly and green cooked vegetables, as peas, beans and cabbage to be avoided, (9) those who from principle objected to the use of spirituous or fermented drinks were recommended to take tea or toast water at meals, while those accustomed to use liquors were to use them in small quantities and of the best quality, (10) long fastings and late suppers to be carefully avoided, (11) soda water as a summer drink was recommended, (12) recommended that the sick should not be attended by more persons than absolutely necessary, thereby lessening crowding and so helping the patients while lessening the danger to the public, (13) warned the public against indiscriminate use of mineral waters and especially against the use of the many kinds of patent medicines so extensively employed, (14) recommended burning, baking and boiling of clothes, and 1 to 4 parts of cloride of lime, (15) advised against unnecessary alarm.

Successive sections advised Local Boards to pay special attention to unsound meat, to cellars, cesspools, privies, etc., stagnant pools, pig-pens, slaughter-houses and butcher stalls, skins, hides and tanneries.

Sec. XVII.—"And no interment shall be permitted within the walls of a church, or the limits of any city or town; crowding grave-yards was forbidden, and the opening of vaults having had recent interments was to be done with the utmost caution."

Undertakers, hotels and boarding-houses were most strictly regulated, and all burials were to be private and within 24 hours.

All ship captains had to report deaths on board, and Local Boards were requested to report weekly to the Central Board.

These precautions seem to have been fairly well observed, as the epidemic did not reach the proportions of previous ones.

The City of Hamilton, suffered, however, severely, a very notable number of deaths having occurred. On the 19th of July, 23 deaths occurred in Hamilton, while about the same time 56 deaths occurred daily in Montreal, while by 1st of August 832 deaths had occurred in Montreal. Domiciliary visits were then carried out regularly, and people under penalty were required to report cases. Cholera was very prevalent this year in St. John, New Brunswick.

On August 26th, 23 deaths occurred in Hamilton Hospital alone.

The Toronto *Leader*, August 20th, says: "The health of the city is improving daily. The number of cholera patients admitted to hospital during the past week does not amount to more than a quarter of the number of previous week. The cemeteries report the same decrease."

The *Leader* editorially stated, August 22nd, that cholera had nearly disappeared in Upper Canada and remarked that the disease really is a punishment for being filthy, and a council must be vested with full power of action.

"If a judicious expenditure of £1,000 had been made last spring by the corporation in removing nuisances, it is probable that one half the persons who have fallen victims to cholera in this city would now be living."

"Will the lessons be turned to practical use in the future?"

"Some of our civic rulers persisted in ignoring the existence of cholera for a whole month after its appearance, and the grossest and most inhuman neglect of the suffering and dying took place." "No place was provided for the patients for weeks." On August 27th there were 2 admissions into the Cholera Hospital, and 27 inmates at the time.

The epidemic of 1854 was practically the last outbreak of cholera in Ontario.

Cholera having appeared in Europe in 1865, created apprehensions lest it should reach Canada in 1866.

April 1866 saw the Central Board of Health appointed by the Governor, the seat of government being then held at Ottawa.

The *Globe* of May 7th says in its New York telegrams: "Two more cases of cholera (one before) have appeared," and on May 8th published the regulations adopted by the Central Board of Health under Sec. 5, Cap. 38, Consolidated Statutes of Canada, and gazetted May 3rd. These regulations consisted of 19 sections containing provisions very similar to those quoted from preceding regulations.

These regulations produced sanitary activity throughout the Province. On May 11th Dr. Tempest was appointed by the city Board of Health of Toronto, Medical Health Officer. Reference is made to a paper delivered by him before the medical section of the Canadian Institute on cholera, in which I find the first mention of its zymotic character. He assumed it was of the class of "zymotic diseases and multiplied in the system."

Letters in newspapers referred to the dangers due to the sewers crudely constructed giving forth into the streets their poisonous gases.

The regulations provide that the mail steamers be boarded at Father Point and inspected, and if free from infection given *pratique* up the river.

All infected vessels had to stop at Grosse Isle or in the St. Charles at Quebec.

The sanitary activity then shown is seen in Ottawa where two Medical Health Officers, Drs. Van Courtland and St. Jean were appointed for six months at salaries of $500 each.

The disease prevailed to some extent in New York all summer, ten fresh cases being reported as late as September 13th; but while cholera ships occasionally reached Canadian ports as Halifax and Grosse Isle, the disease does not seem to have reached Ontario.*

Regarding this epidemic the *London Times* stated that it differed from previous ones, in that while they moved in definite directions, and with a steady progress, this one lingered at different ports as Rotterdam, here and there in England, and only in Paris and Madrid did it take on its old-time virulence.

The last cholera scare comes within our own period 1884 and 1885, but no cases of the disease reached Canada. Only once in the last ten years, viz., September 1887, has cholera reached New York, and that in the steamer *Alesia*.

To modern sanitarians accustomed to seeing Boards of Health permanent y established and pursuing their work systematically in the field of preventive medicine, the spasmodic activity in health matters developed in these early years of the century seems crude, and with results proportionately imperfect; but they have to confess that in too many instances the national memory and health conscience, and still more perhaps the municipal, have by no means arrived at that exalted position which can allow them to adopt the old motto *semper paratus in armis*.

After all, this deadening of the health-conscience and loss of memory of what conditions disease is but another illustration of a phase in the French Revolution, regarding which

*I have been informed by a daughter of Dr. Tempest that one case, which died, occurred in Toronto.

Carlyle says : "Seldom do we find that a whole people can be said to have any faith at all, except in things which it can eat and drink; whensoever it gets any faith, its history becomes spirit-stirring, noteworthy." This in health matters seems only to happen in the midst of death-dealing epidemics. Then and then alone can people be seriously said to have a health-conscience.

That this health-conscience has from time to time been aroused in Canada, we have already pointed out; that its absence has sometimes illustrated Horatio's remark to Hamlet," Custom hath made it in him a property of easiness," is unfortunately equally true.

I may then briefly review the occasions when as shown by Health Acts the health-conscience of Canada became more or less strongly aroused.

It will be remembered, that at the period of the cession of Canada to Britain, the Province of Quebec was the only portion of Canada proper which had an organized government. The Act passed by the Imperial House of Commons in 1774, intituled " An Act for making more effective provision for the government of the Province of Quebec, in North America, and to make further provision for the government of said Province," contained sundry provisions, which were amended in the Provincial Statutes of Lower Canada in 1795 in an " An Act to oblige ships and vessels coming from places infected with the plague or any pestilential fever or disease, to perform quarantine and prevent the communication thereof in the Province."

This Act provided for vessels coming into the St. Lawrence to perform *quarantine* " and remain at such part of said River St. Lawrence or the lands adjoining thereto or islands in the said River, and for such time as may be judged requisite to prevent the communication of diseases that may endanger the lives of His Majesty's subjects."

The second section of this Act of 1794 says, that whenever owing to the presence of pestilential disease, the Lieutenant-Governor shall see quarantine duly performed, and this Act carried into execution by causing any person so authorized to go off to any ship within 60 leagues of Quebec and demand an account from the commander who shall state the place or places where the cargo was taken on board and whether such place or places were infected with the plague or other disease, and how many persons were on board when the ship sailed, and how many died during the voyage ; and if the officer thinks fit such ship shall repair to the place designated ; and in case such master of a ship shall conceal the facts, such commander shall be guilty of felony, and shall suffer death as in cases of felony without benefit of clergy."

Section III. of the same Act authorizes the appointment of a physician to go on board any such vessel to make strict search, examination and enquiry into the health, state and condition of the matter, passengers and marines, and to report thereon without delay to the government.

Section IV. provides for the levying of a fine not exceeding £300 on any commander who allows passengers or mariners to leave such quarantined vessel.

Section X. provides that where such ship is reported free from infection, the Lieutenant-Governor shall give the commander a passport.

This Act was practically that which remained in force till the Act passed by the parliament of Upper Canada on February 13th, 1833, the year after the first outbreak of cholera. We have already referred to the prompt steps taken in the summer of 1832 by the Lieutenant-Governor, which action was approved of by the House, when this Act was passed intituled " An Act to establish Boards of Health and to guard against the introduction of malignant, contagious and infectious diseases in this Province."

The preamble refers to the repeal of certain parts of an Act passed in the 14th year of His Majesty's reign, and thereafter states "That it shall and may be lawful for the Governor, Lieutenant-Governor or person administering the government, to appoint three or more persons in each and every town in this Province, and in such other places as may be deemed necessary to act as health officers within their respective limits.

The Act contained, amongst other provisions, powers stating that :—

1. The Health Officers could enter in and upon premises and order them to be cleaned.

2. That the Governor in Council may make rules concerning the entry and departure of vessels, and the landing of passengers.

3. It provided a penalty of 20 shillings for the violation of any rules or regulations of the Board or obstructing its officers.

4. It finally stated that this Act shall be and continue in force for one year, and from thence to the end of the next ensuing session of the Provincial Parliament and no longer.

From what has already been stated it will appear that Canada was in the van in the good work of establishing Boards of Health and that as far as power to organize and carry on health work, our present most complete Public Health Act, cannot be said to be any advance on this.

Perhaps it may be fairly said that, considering the greatly increased knowledge of the causes of disease existing in the present day, executive control of the public health is not more advanced than then, except in the one most important matter of permanent organization.

Having been fortunate in obtaining details of the cholera outbreak in Toronto in 1849, I append here the study of them, along with the meteorological data, as appeared in the weekly bulletin of the Board published in July, 1884.

Through the great kindness of Mr. Stewart, of the Toronto Meteorological Observatory, I have been supplied with a record, not only of the cases of cholera and the deaths therefrom which occurred during the outbreak in Toronto in 1849, but also with the principal meteorological conditions during the outbreak. The opportunity of obtaining such a treasure of scientific information of nearly 40 years ago in Ontario is so rare that no excuse is necessary for introducing some of the facts, with some inferences into this bulletin. The first reported case occurred on the 6th of July, with a temperature of 72.5°, or 1.6° below the average, but with a relative humidity 12% greater than the average (a low temperature and abnormal humidity existed for four days preceding the outbreak). The case proved fatal the same day. From the table (found below) the weekly conditions indicate, in some cases very markedly, successive important differences in weather conditions; but in many instances the changes which seemed to have influenced the disease are not coincident with the weeks. Some of these will be noticed. On the 9th of July the daily average temperature stood 4.2° above the average, with humidity 11% greater than the average. After two days with no cases, four are reported on the 10th. From the 9th to the 13th there was a steady increase both in temperature and humidity, amounting to 9.3° of the former, and 13% of the latter. Seven cases were reported on the 13th. The temperature changing on the 14th, falls from 88.6° on the 14th to 67.4° on the 15th. It remains cool for four days, but the upward wave of disease, started by the hot weather, as seen on the 13th, with 7 cases, was followed by 10, 19, 16, 13 on the successive cool days. On the 18th the temperature begins to rise again, but the influence of the four cool days has set in, so that for the next three days of increasing temperature we have a decreasing number of cases. With these days, as in the previous hot term, the relative humidity increased much above the average. Five more cool days, from the 21st to the 25th, with a temperature in all, except one, below the average, are accompanied with an increase of cases, always growing less during the last one or two cool days. No particularly marked periods occur, and no marked variations in the number of cases is seen till August the 10th, when a cool period sets in, lasting till the 18th. In the last four days of this period the number of cases notably decreases. An interesting point in this cool term is that the relative humidity is from 5% to 17% above the average, whereas it is greatest in July during the hot periods. On the 18th the temperature increases till it is above the average, and so ranges till the 27th. Humidity was markedly above the average with this heated term. There is after the first day a marked increase of the disease, reaching on the 23rd to 30 cases and 11 deaths. This dates the height of the epidemic. The first three days of September, which, though cool, followed July 31st with a temperature of 76.8° and 14 deaths, have more than 10 cases each day; but after the 3rd of Septemper no day has more than 10 cases, and the disease, with slight daily fluctuations, wears away till the 20th September, after which no cases are reported.

What are some of the inferences drawn from the records?

1. That every term with a temperature above the average was accompanied with a humidity above the average.

2. That every term with temperature below the average, with the exception of one, had no excessive humidity.

3. That after three or four days of increased heat, the number of cases increased, and continued to increase for several days of a succeeding cooler term.

4. Every cool term ended with a decline in the number of cases.

5. Excessive humidity without increased heat was not sufficient to cause an increase of cases.

6. The moment the temperature falls below 70° there is an associated decrease in the number of cases: and when it rises above this there is an increase in the number of cases. This is admirably seen in September, when, after a cool term of four days, the number of cases falls to 2 on the 6th; but the 5th and 6th have temperatures above 70°, and, although on the 8th we have the temperature falling to 58°, the cases have increased to 8, steadily falling again with the cold to 1 on the 11th.

7. Apparently the cholera *microbe* requires a temperature above 70° for its free development, which development is aided by increased temperature up to at least as high as 90°.

8. That successive humidity, with heat, is favorable to its free development.

9. That it takes several days of favorable conditions to develop an abundant crop of *microbes*.

10. That high temperatures, with excessive humidity, are the conditions favorable for all organic decomposition, and abundant *bacterial* life.

11. That, apparently, from the mortality during the first two weeks of September, cold makes the cases more fatal; and that the anomaly in the last week simply indicates that with the wearing out of the disease the cases became more like severe diarrhœa.

It would appear, from an examination of the table, that for the period during which the epidemic prevailed in Toronto there were 769 cases of cholera, out of which number 464 cases terminated fatally. The result for the different months would appear to be as follows :—

	Day.	Cases.	Deaths	Cases per day.	Death per day.	Ratio.
July	26	225	138	8.66	5.31	0.61
Aug.	31	445	261	14.35	8.42	0.59
Sept.	20	99	65	4.95	3.25	0.66

Subdividing the total period into the ordinary week, we have the following result, which may be interesting in comparison with some of the Meteorological elements for the same periods : -

Weeks Ending.	Number of cases recorded.	Number of deaths.	Ratio of death to cases.	Average highest temperature for week.	Average lowest temperature for week.	Mean daily range.	Mean temperature of week, higher or lower than average.	Mean humidity of air, higher than average.
				c	c	c	c	per c.
July 7	4	2	0.50	72.8	53.6	19.2	—0.26	+ 9
" 14	27	17	.65	83.8	63.1	20.7	+5.17	+12
" 21	80	48	.60	75.3	57.2	18.1	—1.89	+ 7
" 28	80	48	.60	74.5	56.1	18.4	—2.36	+ 6
Aug. 4	101	57	.56	72.4	52.8	19.6	—2.92	+ 7
" 11	91	58	.64	72.2	55.7	16.5	—3.62	+ 5
" 18	74	44	.60	71.6	54 4	17.2	—2.29	+ 9
" 25	121	77	.64	75.7	58.4	17.3	+2.33	+ 9
Sept. 1	104	56	.54	73.1	56.2	16.9	+2.61	+10
" 8	55	37	.67	66.3	51.3	15.0	—1.23	+ 9
" 15	23	18	.78	65.6	49.5	16.1	—0.59	+11
" 20	9	2	.22	68.9	52.1	16.8	+0.83	+ 1

The following most interesting history of the importation of contagious diseases into Canada by way of the St. Lawrence has been supplied through the kindness of Dr. F. Montizambert, the Superintendent of the Dominion Quarantine Service of the St. Lawrence :

Quarantine Station, Grosse Isle.

Hospital Returns for the Sixty years 1832-1891.

Year.	Number inspected Port of Quebec.	Admissions.								Deaths.							
		Total.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Total.
1832	51766	...	...	(No Hospital records for this year are discoverable.)													...
1833	21752	239	...	159	34	....	....	....	46	....	(No details discoverable).						27
1834	30935	844	290	404	12	....	29	27	82	159	68	2	....	12	19	4	264
1835	12527	126	....	26	47	...	30	12	11	....	..	6	...	2	2	....	10
1836	27728	452	....	334	48	4	41	6	19	...	39	3	1	11	3	4	61
1837	21902	598	....	481	104	....	9	4	....	..	44	10	....	3	....	....	57
1838	3266	61	....	24	17	5	....	3	16	....	3	....	1	....	....	2	6
1839	7439	189	...	150	1	...	22	....	16	....	6	....	....	2	....	1	9
1840	22234	561	..	485	60	..	9	....	7	....	31	10	....	1	....	2	44
1841	28086	290	....	184	32	4	61	....	9	....	21	2	1	17	...	2	43
1842	44374	488	..	341	77	2	51	2	15	..	42	6	....	4	....	2	54
1843	21727	246	....	174	26	1	35	1	9	..	12	2	..	2	1	2	19
1844	20142	388	....	322	11	13	37	....	5	....	12	1	2	1	....	2	18
1845	25375	463	...	362	73	....	28	....	2	....	21	5	....	4	...	....	30
1846	32753	892	...	679	106	....	93	....	14	....	50	9	....	3	...	5	67
1847*	98106	8691	....	8639	52	....	....	....	....	....	3226	12	....	....	....	....	3238

* 1847. Deaths in hospital, 3,226 ; interments, 5,424. The difference is made up of those who died on vessels in quarantine, or upon landing, but before they could be entered in the hospital books.

QUARANTINE STATION, GROSS ISLE.—*Continued.*

YEAR.	Number inspected Port of Quebec.	ADMISSIONS.								DEATHS.							
		Total.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Total.
1848	27939	581	....	302	31	....	18	154	76	....	53	1	....	7	37	29	127
1849	38494	859	3	605	34	1	42	111	63	56	46	6	....	3	35	14	160
1850	32292	359	....	224	38	....	5	31	61	....	13	2	....	1	4	4	24
1851	41076	594	....	179	87	1	116	36	174	....	11	5	1	12	15	10	54
1852	39176	287	....	64	47	9	58	15	94	....	5	....	....	5	2	6	18
1853	36699	278	....	49	31	....	36	27	135	....	6	1	....	7	8	10	32
1854	53180	690	14	39	133	6	164	55	279	8	7	6	5	16	5	18	65
1855	21274	232	....	107	106	....	19	22	178	....	5	5	....	5	4	16	35
1856	22439	263	....	33	8	9	61	10	142	....	3	....	2	7	....	8	20
1857	32097	417	....	62	4	30	115	12	694	....	12	1	2	12	5	5	37
1858	12810	227	....	17	3	6	75	7	119	....	1	....	2	12	2	4	21
1859	8778	92	....	20	22	....	....	....	50	....	....	....	....	....	....	....	....
1860	10150	92	....	16	26	....	....	1	49	....	1	5	....	....	....	4	10
1861	19923	341	....	14	103	....	66	21	137	....	2	8	....	11	3	1	25
1862	22176	367	....	151	47	....	37	25	107	....	34	7	....	8	9	....	58
1863	19419	44	....	17	1	....	....	....	26	....	1	....	....	....	....	....	1
1864	19147	60	....	31	8	1	....	....	20	....	2	3	1	....	3	....	9
1865	21355	33	....	....	5	....	1	6	21	....	....	....	....	....	3	....	3
1866*	28648	271	....	23	15	....	67	....	166	....	6	....	....	6	....	11	23
1867	30757	375	....	33	65	....	42	58	177	....	7	3	....	2	8	4	24
1868	34300	424	....	10	19	2	143	....	248	....	....	1	....	22	....	5	28
1869	43114	494	....	139	50	10	68	....	227	....	27	1	2	8	....	6	44
1870	44475	392	....	1	50	....	175	13	153	....	....	2	....	....	1	3	6
1871	37020	267	....	10	34	27	35	17	144	....	....	....	3	....	2	2	7
1872	34743	309	....	38	77	8	45	26	115	....	....	9	....	5	1	5	20
1873	36901	114	....	4	15	....	36	3	56	....	....	....	....	4	....	....	4
1874	23894	62	....	2	....	....	22	3	35	....	1	....	....	2	....	....	3
1875	16038	70	....	2	....	....	29	1	38	....	....	....	....	2	....	....	2
1876	10900	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
1877	7743	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1878	10295	7	....	1	....	....	....	....	6	....	....	....	....	....	....	....	....
1879	17251	7	....	6	....	....	....	....	1	....	....	....	....	....	....	....	....
1880	24997	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1881	30238	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1882	44850	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1883	45966	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
1884	31529	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....
1885	17035	6	....	....	6	....	....	....	....	....	....	....	....	....	....	....	1
1886	22782	13	....	2	5	....	....	....	6	....	1	2	....	....	....	....	3
1887	32749	70	....	9	....	3	25	6	27	....	1	....	....	....	3	....	4
1888	37721	54	....	6	1	1	13	4	29	....	1	....	....	....	....	1	2
1889	27571	33	....	3	1	....	16	....	13	....	....	....	....	....	....	....	....
1890	27447	51	....	2	5	1	10	1	32	....	....	....	....	1	....	....	1
1891	33021	59	....	3	3	1	16	....	36	....	1	....	....	....	....	....	1

* 1866. Present Medical Superintendent joined Quarantine staff.

"Number inspected," does not include the crews, but passengers only.

The old division of diseases here has been followed out.

"Fever" means principally Typhus Fever, but also includes occasional cases of Yellow Fever, Relapsing Fever and Enteric Fever.

"Other diseases" include Diphtheria, Chicken-pox, etc., etc.

F. MONTIZAMBERT, M.D., F.R.C.S., D.C.L.,
Medical Superintendent St. Lawrence Quarantine Service.

NOTE.—It will be noticed that in 1849 there were 3 admissions for Cholera and 56 deaths, showing presumably its spread in the wards. The unusual number of admissions and deaths from "Dysentery and Diarrhœa" in 1849 and 1850 is also what one would expect at such a time.

I am very sorry that no "Hospital Returns" for 1832 are to be found. It was an entirely *military* station that year its first), and I presume the records, if any would be only with the regimental records.—F.M.

CHAPTER II.

TEN YEARS OF PUBLIC HEALTH WORK IN ONTARIO.

In the preceding chapter there have been briefly set forth some of the chief facts relating to the public health during the era preceding the establishment of permanent Provincial and Local Boards of Health in Ontario. I now purpose referring to some of the principal matters which have occupied the attention of health authorities both Central and Local since the establishment of the Provincial Board in 1882.

The following classification may be said to include the principal classes of subjects which the Provincial Board has especially given its attention to; and which may be said, so far as this Province is concerned, to cover the work which to the Provincial Board of Health has seemed to come within the scope of the work which it was especially organized to carry out.

1. Machinery of Public Health Work.
    1. Provincial Board of Health.
    2. Local Boards of Health.
    3. Association of Executive Health Officers.
    4. Councils.
    5. Boards of Trade.
    6. Citizens' Committees.

2. Collection of Sanitary Information.
    1. Reports of Disease by Physicians and Local Boards.
    2. Annual Reports of the Local Boards.
    3. Communications from Local Boards and individuals.
    4. Investigations by Committees of the Board and its Officers.
    5. Reports of Foreign Health Boards.

3. Dissemination of Sanitary Information.
    1. Bulletins of the Board.
    2. Annual Reports of the Board.
    3. Sanitary Conventions and reports thereof.
    4. Communications with Local Boards and individuals.
    5. Special Investigations in different localities.

4. Health Legislation.
    1. Act of Establishment of the Provincial Board of Health 1882.
    2. Public Health Act of 1884.
    3. Amendment of 1885 to the Health Act.
    4. Amendment of 1886 to the Health Act.
    5. Amendment of 1887 to the Health Act.
    6. Amendment of 1889 to the Health Act.
    7. Amendment of 1890 to the Health Act.
    8. Amendment of 1891 to the Health Act.
    9. Municipal and other special Acts referring to health matters.
    10. Quarantine Laws of Canada.
    11. Inter-provincial and inter-state agreements, regarding notification of outbreaks of disease.

5. Investigations into Causes of Disease.

1. Waste organic matter.
2. Destruction of refuse.
3. Disposal of sewage.
4. Sewerage systems.
5. Sub soil drainage.
6. Mill-dams, mill-ponds. and drowned lands.

6. Outbbeaks of Disease.

1. Classes of outbreaks.
2. Vaccination.
3. Isolation hospitals.
4. National quarantine system.
5. Inter-state notification.
6. Laws relating to outbreaks.

7. Food and Drink Supplies.

1. Water supplies.
2. Milk supplies.
3. Meat Supplies.
4. Flour and other foods.
5. Laws to regulate the same.

8. School Hygiene.

1. Inspection of schools.
2. Construction, ventilation and drainage of schools.
3. Vaccination of school children.
4. Laws regarding infectious diseases in schools.

9. Public Institutions.

1. Outbreaks of disease therein.
2. Sanitary condition of public institutions.
3. Disposal of sewage in same.

In addition to the preceding subjects dealt with in the report proper of the Board, the following list presents a *resume* of the reports, addresses, etc., presented to the Board by its committees, or which have been delivered by its members at sanitary conferences or public meetings to discuss health matters.

1882.

Report of Committee to England *re* Sanitary Matters.
Report of the Committee to Boston, New York and Albany.
Report of Delegate to the International Congress of Hygiene to Geneva.
Report of Committee sent to visit Michigan, Detroit and Toledo Boards of Health.
Circular to Clerks of Municipalities asking for information regarding disease, etc.
Circular to Physicians.
Pamphlet on "How to Check Contagious and Infectious Diseases."
Treatment of the drowned.
Report of the Commission to investigate typhoid at Sarnia.
Report of Commission to investigate malaria at Coboconk and Madoc.
Report of Commission to investigate typhoid at Chatham.
Report of Commission to investigate typhoid at Lambton Mills.
Report regarding water supply and disposal of sewage of Toronto.
Report of Committee on emigrant inspection.
Report of Committee on disease reports.
Report of the Committee on legislation.

Addresses, etc.

By Chairman.
On Food Adulteration.
Contamination of Drinking Water.
Contagion.
Public Schools and Public Health.
Prevention and Restriction of Contagious Diseases.
Sewerage as a Sanitary Measure.
Heating and Ventilating of Buildings.
Typhoid and other Zymotics and how to Prevent them.
School Sanitation : Its Necessity and Methods.

1883

Summer Resort for Children.
American Public Health Association at Detroit.
Report of Committee of Ontario Medical Association *re* Public Health, Vital Statistics, etc,
Directions *re* Asiatic Cholera..
On Disposal of Sewage.
Report of Leslieville knackery and fat-rendering establishment.
Report on condition of Ashbridge's Bay.
Report on the smoke nuisance in Toronto.
Report *re* saw dust at Parry Sound.
Re a text-book on Hygiene for schools.
Medical inspection of schools.
Sanitary arrangements and health conditions of Hamilton schools.
Report of the London Sanitary Convention.
Paper read before the Hamilton Literary Association.

1884.

The Public Health Act.

1885.

Report on poisons and chemicals.
Report of the London sewage investigation Committee.
Report of the Committee on epidemics.
Report on typhoid fever at Kingston Asylum.
Report on the establishment of the Vaccine Farm.
Report *re* Infanticide.
Report *re* the sewerage system of Woodstock.
Report on Maritime and Land sanitation.
Report *re* the inspection of cemeteries.
Report of the St. Mary's cemetery.

1886.

Health notes of a trip in Britain.
Report *re* abattoirs and slaughter houses.
Report *re* nuisances arising from cheese factories, etc.
Report of Committee on food and drinks and ice supplies.
Report of Committee on sewerage *re* Stratford and other towns
Report *re* starch factory nuisance at Brantford.

1887.

Report *re* the quarantine station at Grosse Isle.
Report *re* anthrax at Guelph.
Report *re* outbreak of diphtheria in Nipissing District.
Report *re* Ottawa fever outbreak.
Report *re* sewer nuisance at Hamilton.
Report *re* water supply for Belleville.
Report *re* Berlin and Brantford water-works.
Report *re* foods and adulterations, and public milk supplies.
Report *re* ventilation.
Report *re* poisons.
Report *re* grounds for cemetery at Bradford.
Report *re* International Conference of State Boards of Health.
Report *re* meeting of the American Public Health Association.

1888.

Report *re* school hygiene.
Report *re* quarantine.

1889.

Report *re* small-pox in Elgin County.
Report *re* disease amongst horses at Sanford.
Report *re* disposal of sewage in England.
Report *re* sewage and water supply on farm at London Asylum.
Report *re* porous carbon system (sewerage) at Agricultural College.
Report *re* poisons.
Report *re* a fat-rendering and hog-feeding establishment in East Zorra.
Report *re* Union schools at Simcoe, County Norfolk.

1890.

Report *re* sanitary progress in Britain and on the continent.
Report *re* physical culture in Normal, Model and Public Schools.
Report *re* sewerage system for Brantford.
Report *re* Conder system of sewerage at Belleville Institute.
Report *re* flooding of land along South River.
Report *re* public water supply of Orillia.
Report *re* Beaverton mill-dam nuisance.
Report *re* diphtheria at Kingston Asylum.

It will be of interest to refer very briefly to some of these subjects and to set forth what seem to be the conclusions which may be drawn regarding them after an experience of ten years of public health work.

Public Health Legislation and Machinery of Public Health Work.

At the organization of the Provincial Board in 1882 there existed in the Province, as already has been noticed in Chapter I, various public health enactments, which may be said to have been consolidated in Cap. 190, R. S. O. 1887. Under this old Act the provision was made whereby the municipal council of every city, town, village and township shall be *de jure* health officers. while these might delegate their powers to a committee of their own number or to such other persons as the council thought best.

Various sections of the Act gave to these committees extended powers for dealing with public health matters.

Under the same Act, the Lieutenant Governor had power to organise a Central Board of Health for such time as might be fixed by Order in Council, and to have power to appoint Local Boards wherever the mayor and council had failed under the Order in Council to appoint three persons as a Local Board of Health in lieu of the committee of the council.

This Act is practically that passed in 1849, when fears, unfortunately too fatally realised, existed of the introduction of cholera into Canada.

Such a Central Board was formed in that year, in 1854 and in 1866 all of which were cholera years.

The Provincial Board in order that it might carry out its work, then almost wholly of an advisory character, sent out circulars in 1882 and 1883 requesting municipal councils to inform it whether such committees of health, as provided under this Act, existed, and if not, urging them to make such appointments.

The report for 1882 says in regard to this: "We regret to say that the replies were not as numerous as they should have been. This seems to have been in some cases due to neglect on the part of of the clerks to present the documents to the council."

This work of urging the formation of Local Boards was pushed in 1883 as far as possible with the result, set forth on page xxix of the Report for that year, as follows:—

Local Boards in existence in the forty Counties	50
Counties with no Boards	12
Counties with one Board	15
Counties with two Boards	6
Counties with three Boards	3
Counties with four Boards	1
Counties with five Boards	2
Boards with Sanitary Inspectors or Health Officers	2(one salaried.)
Medical Health Officers	4
Medical men on Board	3
Boards with three salaried members	1

Such a showing was not encouraging, and the Provincial Board felt after two years' experience, that if its operations were to be of that practical value which the interests of the public health demanded, legislation, based upon some principle of compulsion, was urgently required. There seems to be little doubt but that these two years of missionary work had been of much value in spreading abroad the knowledge of the needs of public health work, and of creating on the part of very many a demand for some more organised and positive methods by which the Central Boards could require the establishment of Local Boards, and to some extent insist on their performing public health work.

To this end what is now known as the Public Health Act, was prepared with the approval of the Government, and after much discussion in the Legislature and out of it, the bill with sundry amendments became law. Under this law the formation of Local Boards of Health by the appointment of a definite number of ratepayers became compulsory on the part of Councils, or on their failing to appoint, on the part of the Provincial Board of Health. (*Vide* Sec. 39, Cap. 205, R.S.O., 1887).

That the effects of this Act was to give a great impetus to public health work may be gathered from the fact that during the half year of 1885, after the Act came into force, there were formed in the 447 townships 184 Local Boards; while in the 203 cities, towns and villages in Ontario 180 Local Boards were organised. In the townships there were also appointed 25 medical health officers, and 19 others appointed sanitary inspectors, while 17 Boards appointed both. Of the city, town and village Boards 155 appointed either a medical health officer or sanitary inspector, 63 having medical health officers, and 92 sanitary inspectors, and 44 Boards appointed both classes of officers.

This impetus to sanitary work was doubtless accentuated by the outbreak of a very serious epidemic of small-pox in Hungerford and the adjoining townships.

The value of organisation was, however, immediately seen and realised by the Province; for although 150 persons had been infected before knowledge of the nature of the

outbreak, or its extent had become known to the Provincial Board, prompt action in organisation had the effect of limiting the epidemic to 203 persons in the townships and stamping it out within two months.

The existence of cholera at Toulon and Marseilles in the Mediterranean, and fears of its appearance in America in 1885 had the effect of urging the Board to still more strenuous exertions in organisation, and it succeeded in having certain defects of the new law removed by an amendment of the Act (*vide* sect. 31, *et seq.* cap. 205, R. S. O., 1887), giving the Provincial Board power to require Local Boards to appoint medical health officers within five days after request in cases where there is reason to fear the advent of formidable contagious disease.

This amendment and the duties laid upon such officers by the Act were such as to associate with the Provincial Board of Health an active organisation of medically trained officers, extending throughout the whole Province, and ready at a moment's warning to set the whole public health machinery in motion. The opportuneness of this amendment could in no way have been better illustrated than by the events of the year 1885, which became memorable in the annals of the Board, as that of the Montreal small-pox epidemic.

During the early part of the year several isolated cases of small-pox had occurred in Ontario, a few in Hungerford, and one or two other eastern localities. The organisation of Local Boards was urged forward in view of these facts, but especially on account of the growing frequency of cases of the same disease in Montreal, where during these months 22 deaths occurred.

These outbreaks caused the issue of a vaccination circular on May 16th, and in June the following additional circular was sent out :—

OFFICE, PROVINCIAL BOARD OF HEALTH,

TORONTO, June 10th, 1892.

To.....Municipal Clerk.

DEAR SIR,—In view of the widespread existence of small-pox in Montreal and the imminent danger there is of an epidemic of the disease occurring therefrom in this Province, I would request you, in conformity with Sections 2 and 3, Public Health Act, 1885, to at once—*within five days*—report the appointment by the Council of your municipality of a Medical Health Officer, who shall be prepared to vaccinate and take such other prophylactic measures as will be most likely to limit the disease, should it make its appearance in your locality.

I have the honor to be,
Your obedient servant,

P. H. BRYCE,
Secretary.

N. B.—Should the Council not have already complied with the provisions of Section 12, Public Health Act, 1884, they will, I trust, do so without delay, in order to thus avoid the disagreeable duty imposed upon this Board of carrying out the provisions of Section 19 of the Act.

The result of the first circular caused general municipal vaccination to be carried out in 100 districts.

The result of the second, with the epidemic in Montreal increasing, is seen in the fact that in some 600 municipalities, there were appointed 563 Local Boards, 283 Medical Health Officers, and 160 Sanitary Inspectors, with numerous vaccination officers.

This staff of local officers during the progress of the epidemic was assisted by the appointment of medical inspectors of the Provincial Board for all trains and lines of steamboats, by which passengers could come into the Province.

How efficient was the organisation is seen in the following extract from the report for 1885 :

"It must be evident from this exhibit that without any special centre of infection in the Province, similar to that of Montreal, or that of Hungerford last year, there were in 1872, 1873 and 1874, 775 cases of small pox in twenty-nine counties of the Province with 371 deaths ; while with two such extended centres of infection as those referred to, in the Province during the same year, and with the means of communication between the different parts of the Province greatly facilitated by means of railways, there have been as already shown, only ten counties in which cases have occurred, while the total cases

during 1883, 1884 and 1885, in Ontario have been 250, and the total deaths, inclusive of those dying in Hungerford in 1885, from the outbreak at the end of 1884, have been but 84 deaths," and the further fact that of these deaths only 19 occurred in Ontario during the time of the Montreal epidemic, while it is calculated that there were nearly 7,000 deaths in the Province of Quebec during the same period. As the experience of 1885 indicated a few further additions to the Act, it was amended by provisions for the compulsory occupation of unoccupied premises for temporary use as an isolation hospital. (*Vide* Sec. 22 to 28, cap. 205, R. S. O., 1887.)

In addition to this amendment the Vaccination Act was amended during the same year, by which Local Boards of Health are empowered to carry out the powers given to municipal councils under the previous Act, in case after a month's notice the council has neglected to put into force the provisions of the Act. The amendment further provides for compulsory vaccination of persons every seven years in case the existence of small-pox in any municipality makes the same necessary in the opinion of the Provincial or Local Board of Health.

Trustees may also require children to present certificates of successful vaccination before admittance to the schools of the Province.

The events of the previous year might naturally have been expected to accentuate the progress of public health work, and that this was the case is seen not only in the above legislation, but in the fact that 610 Local Boards were appointed in 1886—the list of municipalities thereby being practically complete in the matter of organisation.

This year saw too, another important mark of rapid progress in Canadian sanitation. For almost 20 years from the time of the cholera in 1866, the St. Lawrence quarantine system had become inactive and inefficient, owing doubtless to the influence of the great steamship companies in the matter of rapid transit in competition with the New York steamship service.

With the experience of 1885, and the outbreak of small-pox on the Canadian Pacific Railway steamers on Lake Superior caused from some Russian immigrants who had left some of their sick at Grosse Isle, the Board, as also the newly-formed Provincial Board of Quebec were not in a humor to see small-pox again become epidemic through this or any other channel ; and hence it was that the Provincial Board published its quarantine report, pointing out the urgent need of a remodelling of the quarantine system along lines most of which had been in vain urged for years with persistency by the Superintendent of the Grosse Isle Station.

It was therefore with pleasure that the Board and public were made acquainted with an Order-in Council dated Ottawa August 7th, 1886, containing regulations, providing for efficient protection against the introduction of contagious disease *via* the St. Lawrence, in case its provisions were carried into effect.

The year is further notable as being the one in which the American Public Health Association held its annual meeting in Toronto, and during the session of which was organized the Association of Executive Health Officers, the work of which has been of the greatest advantage in unifying and consolidating public health work in the Province.

As will be seen by reference to the summary in the beginning of this chapter, the work of 1887 partook more of the features of what may be characterised as municipal sanitation. It was to be expected that with the experiences and lessons of previous years Local Boards would soon come to realise that true sanitation extends to the prevention of those diseases which are of a more domestic or endemic character. During the year 1886 diphtheria had appeared and extended its ravages in the Province causing deaths many times more numerous than those from small-pox at any time. In the five preceding years diphtheria had caused in Ontario 4,793 deaths, while in the single year, 1886, no less than 1,470 were recorded This high death-rate caused Local Boards, as also the Provincial Board, to direct their attention to the special causes which tended to disseminate this pest. At the fourth quarterly meeting of the Provincial Board the subject was specially considered, and Regulations *re* Diphtheria were drafted for submission to and approval of the Government. They were not made an Order-in-Council, but Cap. 205, R. S. O., was amended (*vide* Sect. 9) so as to give the Provincial Board power to deal

directly with outbreaks of this and other diseases, by being empowered to require Local Boards to exercise "any of said powers, (of any Health Act) which in the opinion of the Provincial Board, the urgency of the case demands."

Legislation regarding this and other like diseases was further improved in the same year, by enactments (*vide* Sect. 94, Cap. 205, R. S. O.) intended to control the spread of the disease in the schools of the Province. The Local Boards require by these clauses to be informed by the teachers of such schools, and children are to be prevented from attending school till they and the households are certified by the medical health officer, free from contagion.

The regulation of ice supplies (*vide* Sec. 55, Cap. 205, R. S. O.) was further provided for, while the inspection of slaughter-houses, dairies, cheese-factories and creameries, was specially legislated upon, (*vide* Sect. 54 and 65, Cap. 205, R. S. O.) and various other sections of the Act were amended.

Power was also given (*vide* Sect. 109, Cap. 205, R. S. O.) for any complainant in the matter of a grievance, where a Local Board of Health neglects its duty to apply to the courts under the Public Health Act for removal of the nuisance complained of.

The Provincial Board further, with a view to aiding Local Boards in their endeavors to improve the public milk supply, drew up a series of regulations by which Local Boards could regulate by license dairymen and milk-vendors, and suggested a common standard for the quality of milk.

These have been adopted by most of the cities and towns and have effected a marked improvement in this universal food

The matter of the destruction of town refuse was dealt with in the same report, and drawings of the most complete furnaces for the purpose were supplied.

In the year 1888 during an outbreak of small-pox spreading from Buffalo, the following Order-in-Council was passed: "That every Local Board of Health and its Medical Health Officer shall at once notify the Provincial Board of Health of all and any cases of cholera and small-pox, and such other outbreaks of diphtheria and scarlet-fever as occur within the limits of the jurisdiction of said Local Board." Owing to the prevalence of an epidemic of diphtheria in the frontier unorganised new settlements it was found that the Public Health Act had not made provision for prompt action in these districts owing to there being no municipal organisation. With a view to supplying power to deal with these outbreaks Cap. 42, 52 Vict. was passed by which the stipendiary magistrates of these districts have the power of Medical Health Officers under the Act, and the Provincial Board may from time to time appoint sanitary inspectors with powers given to the same under any Public Health Act; while constables appointed for any Provincial judicial district are *ex officio* sanitary inspectors.

Factory Acts in 1887 and 1889 were passed, intended to deal specially with the health of employees, as regards prevention of accidents, and improvement of ventilating and other sanitary appliances.

As the work of Local Boards has increased, many evils previously but little understood as to their nature, or not fully comprehended as to their extent, have come into prominence and attempts to deal with them have been made. Especially is this the case with diseases of animals. Tuberculosis has been found to be of undersirable frequency in milch cows and other cattle. Actinomycosis has been accurately diagnosed, and its contagious character demonstrated; while anthrax and hog-cholera have from time to time appeared in localised outbreaks.

With a view to dealing effectively with these diseases, detrimental both to the high character of Ontario stock and to the public health interests, an amendment to the Consolidated Act, Sec 99, was passed which provides that any Medical Health Officer may cause to be seized, any animal known to be affected with any of these diseases. Prosecution of any person who has in his possession any animal he knows to be suffering from any of said diseases may likewise be made.

During 1891 the Consolidated Act, 1887, was amended, with a view to combining local sanitary areas now under Local Boards of Health, as townships, under a single Medical Health Officer, who is to be known as a County Medical Health Officer. This provision if carried into effect will give to such officer the powers now laid upon any Medical Health Officer, and supplies a method by which such officers can be paid an adequate remuneration for the more extended work laid upon him as a county officer.

Such is a summary of the advance in legislation in the ten years during which the present public health organization has existed. Its steady growth is not more illustrative of the unlimited extent to which the work of protecting the public health by preventing disease is capable than it is of the rapidly increasing knowledge on the part of the public of the meaning of Preventive Medicine, and of the practical value of the measures recommended by Boards of Health and carried out by their Executive Officers.

CHAPTER III.

PUBLIC WATER SUPPLIES.

During the year as will be seen from the analyses in the accompanying Table much attention has been paid to the public water supply problem in Ontario, considered from the health standpoint.

As has been before remarked, Ontario stands in a unique position amongst the countries of the world, or even States in America, as regards water supplies. It is practically surrounded by immense bodies of fresh water lakes, on the shores of which many of its most important cities are built. But in addition to this the undulations and erosious of the underlying rock-strata, and the varying depth and character of the soils of the post-glacial deposits, create not only numerous inland lakes, streams and large rivers, but also underground waters both artificial and deep. Indeed water supplies of every class abound and many districts are so favorably situated that it becomes a question to decide which of the several shall be adopted for public purposes.

As regards the qualities of these waters of different kinds, something has before been said and much has been written in other countries as regards constant characters attaching to each class. It may be said in a broad way that there are certain distinctive differences attaching to the several waters; but a glance at the analyses will show in many cases that as regards the same waters analysed at various times, differences exist quite as marked as those distinguishing the different classes.

(The Analyses are made in parts per Million)

Class I: Great Lakes.

——	Month.	Year.	Free Ammonia.	Albuminoid Ammonia.	Chlorine.	Oxygen in 4 hrs.	Oxygen in 15 min.
Windsor	December.	1891	0.032	0.280	4.00	2.064	.....
Niagara Falls	October ...	1891	0.026	0.092	4.80	0.530	0.131
Niagara Falls.	October ...	1891	0.036	0.122	4.80	0.536	0.179
Mimico	April	1891	0.040	0.084	5.00	.....	.....
Toronto	April	1891	0.016	0.090	4.40	0.844	0.086
Brockville No. 1	September.	1891	0.026	0.126	5.60	0.708	0.340
Brockville No. 2	September.	1891	0.020	0.120	6.00	0.820	0.365

Class II: Laurentian River Waters.

Parry Sound (June)	June	1891	0.140	0.180	1.50	3.690	2.190
Parry Sound	December.	1891	0.015	0.120	1.60	2.348	1.624
Arnprior, Ottawa River	November.	1891	0.016	0.190	2.00	7.560	....
Arnprior, Madawaska No. 1	November.	1891	0.002	0.190	1.40	4.708	.....
Arnprior, Madawaska No. 2	November.	1891	0.018	0.200	1.40	4.576	.....
Rat Portage No. 1	March	1892	0.160	0.140	3.50	0.608	.....
Rat Portage No. 2	March	1892	0.035	0.333	3.50	7.236	....

Class III: Deep Underground Waters.

——	Month.	Year.	Free Ammonia.	Albuminoid Ammonia.	Chlorine.	Oxygen in 4 hrs.	Oxygen in 15 min.
Chatham (Jordan well)	October	1891	0.320	0.126	204 8	.....	.....
(Moodie well)	October	1891	0.340	0.055	203.0	.....	.....
(Purser well)	October	1891	0.016	0.200	48.4	.....	.....
Chatham Water Works No. 1 (well)	February	1892	0.320	0.080	202.0	1.068	0.400
Chatham Water Works No. 2 (stand-pipe)	February	1892	0.320	0.100	202.0	1.292	0.808
Chatham Water Works No. 3 (tap)	February	1892	0.400	0.080	202.0	0.740	0.421
Essex Centre	June	1891	0.252	0.980	34.0	2.025	0.695
Goderich No. 1	March	1892	0.013	0.040	39.0	0.454	0.189
Goderich No. 2	March	1892	0.013	0.040	40.0	0.262	0.188
Lindsay	February	1892	0.320	0.045	7.0	0.696	0.584

Class IV: Shallow Under-Ground Waters.

Waterford	November	1891	0.010	0.030	6.4	0.428	0.049
North Toronto No. 1	May	1891	0.013	0.260	5.0	.....	.....
North Toronto No. 2	May	1891	0.002	0.880	6.0	.....	.....
Kincardine	April	1892	0.040	0.112	19.2	.....	.....

Class V: Spring Creeks.

Berlin No. 1	November	1891	0.026	0.12	4.00	2.160	1.484
Berlin No. 2	November	1891	0.020	0.21	4.00	2.564	2.292
Georgetown	September	1891	0.020	0.09	3. 2	1.602	0.720

Class VI. Rivers.

Guelph	April	1892	0.132	0.16	4.00	.....	.....
Scugog No. 1 (at Lindsay)	February	1892	0. 72	0.38	6.00	5.240	.....
Scugog No. 2 (at Lindsay)	February	1892	0. 64	0.36	6.00	4.600	2.264

Class VII: Wells.

Berlin	November	1891	0. 08	0.131	48.0	1.576	1.248
Snyder Well Waterloo	October	1891	0. 08	0. 15	.....	.....	.....
Well at Wyoming	October	1891	0.018	0. 15	20.8	2.076	0.960

From wells at Petrolia only a few oz. of water were sent in. The chlorine of each sample was determined as below in parts per 1,000,000.

Wells.		Cisterns.	
a	4.8	1 B	144.0
b	222.4	1 C	144 0
c	33.6	1 J	169.6
e	10.4	1 McB	132.0
f	65.6	1 R	163.2
g	4.8	1 S	280.0
h	16.0	1 X	132.0
i	32.0		

A study of these Tables, as indeed the study of the chemical analysis of any series of water samples, makes it manifest that no single characteristic nor combination of qualities, is sufficient to form absolute conclusions upon, as regards their sanitary excellencies or defects.

The following from the Massachusetts State Board of Health Report for 1889, neatly sums up the matter.

"Students of sanitary science have attempted to establish certain standards of purity of water based on the determination of nitrogen. These standards express limits for organic nitrogen or albuminoid ammonia, free ammonia, nitrites and nitrates, beyond which the water containing them should not be used for drinking. Some of them have the sanction of sanitary congresses and some are merely the expression of individual opinion.

"The application of these standards of purity has condemned many waters, which were certainly unfit to drink, but it is equally certain that many wholesome waters have been thereby also rejected. The fallacy involved in making "standards of purity," based upon the organic nitrogen, ammonia, nitrites and nitrates, is apparent when we consider that these substances are not injurious in themselves, at least to the extent they are found in natural waters, and that the presence of any one of these substances in water does not in itself necessarily carry with it any indication of its origin. These standards are relics of days in which the harmfulness of a water was supposed to be the direct result of the injurious action of specific substances found in it. The theory of to-day is that it is (in the large majority of cases) to the presence of micro-organisms in water that its harmful influence is due, and that the results of chemical analyses have their highest value in the light that they throw on the quality of the water from the standpoint of bacterial contamination.

"The use to which these determinations should be put, therefore, is to discover, if possible, the origin and history of the nitrogen compounds in the water. The study of the long series of results obtained in the analysis of waters of the state of widely different character and surroundings together with results obtained at the Lawrence Experiment Station of sewage purification by intermittent filtration, has broadened our views of the subject and has enabled us to break away from many of the traditions which have hitherto controlled the opinions of sanitarians."

The diagrams given on the preceding page, giving the death-rates of various cities, further illustrate this fact.

With regard to Chicago, as various analyses of its waters show, there are very few days in which the presence of sewage contamination, shown by analysis, (1556) reaches a point, such as to bring the water below the line of a first-class water. Yet if a series of analyses of the same Chicago water be compared in connection with wind currents, it becomes apparent that the analyses do show at certain times corresponding with certain winds such differences as to cause sewage contamination to be suspected. This contamination is beyond doubt proved by the prevalence of typhoid fever and the numerous deaths therefrom.

Turning, however, to the classes in the Table, it must be concluded as regards underground waters at Chatham from beneath the densest blue clay, rising to the surface 60 or 70 feet in borings into a stratum of water-bearing sand, lying upon the hard Hamilton calcareous shales, that they exhibit such marked abnormalities, both as compared with one another and with other classes of water, that we must consider them as a class *sui generis*, having no features in common with shallow underground, or with any surface waters.

In some samples free ammonia is abnormally high, in some low, while the sample which may show high free ammonia may be low in albuminoid ammonia, while the opposite is seen in other samples. Again, if the chlorine be studied along with these, one would at first conclude that some samples are undrinkable; while in another albuminoid ammonia is high and chlorine low, as compared with other samples having much less albuminoid ammonia. (In this connection it may be mentioned that artesian waters are usually high in chlorides and frequently high in free ammonia, and in some cases albuminoid as well. This is seen in the artesian wells of Illinois.)

Some of these samples were taken from test-borings recently made in the middle of meadows through the blue clay, where surface contamination was absolutely impossible. It will be remembered that this district is almost a prairie region and that it overlies the petroleum-bearing rocks and that in all these wells gases come up with the water. The flow from an individual well 12 inches in diameter, in some instances amounts to 300 gallons per minute and one of these waters is being piped to supply Chatham situated on the Thames, a muddy stream, at this point on a level with lake St. Clair. The water from the sanitary standpoint, appears unexceptionable and is likely to prove a most satisfactory supply.

The Chatham samples marked water-works 1, 2, 3, are the same water taken from the well where the flow is directly from the boring, from the receiving well and from a city tap, after flowing four miles through an iron pipe.

In the class of shallow underground waters the same differences are seen, not only between waters from different sources, but from the same well at different periods. That of North Toronto well illustrates this point. The water rises from a coarse sand lying on the top of blue clay some 22 feet from the surface. The well is on ground rather higher than any surrounding it, the surface being undulating, unless at a distance of a mile or two. The water flows in very rapidly, a well 12 feet in diameter supplying some 7,000 gallons an hour. No buildings are within a quarter of a mile and the well is sunk in an old meadow. The two samples taken at different periods show marked variations from each other. Apparently the high albuminoid ammonia in the second sample is directly due to the solution of albuminoid matter from the deep roots of the meadow grass. The presence of any deleterious matter beyond this seems an impossibility.

The sample of Waterford water taken from a spring is interesting, since, while showing the lowest free and albuminoid ammonia of any sample, it was forwarded for analysis on the supposition that it had caused an outbreak of typhoid.

The same remarks may be made with regard to spring-creeks in the matter of vegetable contamination, but in these it is manifest that quite another possibility of danger arises. They are seen to have as much chlorine and more albuminoid ammonia than Chicago water, proved positively dangerous by prevalence of typhoid.

They everywhere swarm with bacteria; and it is manifest that, with barnyard or sewage contamination above, and a temperature at certain seasons favorable to multiplication of bacteria, they may similarly become dangerous in a manner impossible to either of the underground sources.

Allied to these latter is such a water as that of Windsor, which although a great lake water, has been flowing between banks in the St. Clair river where sewage pollution occurs and afterwards flows out of lake St. Clair, a broad and shallow expanse, loaded with vegetable matter, into the Detroit river. While its chlorine is no greater than that of lake Erie or lake Ontario, it will be seen that though its free ammonia is as low as either, yet its albuminoid ammonia is thrice the amount of either. That this water may and almost certainly will become a dangerous water may be learned from the facts in the report in Part II on Windsor and Walkerville Water Supply, from which it will be seen that Walkerville pours a notable amount of sewage into the river at a point less than a mile above the Windsor intake.

This contamination may be taken as an explanation of the prevalence of typhoid in Windsor in 1890, as compared with that of Detroit which takes its water several miles higher, as seen in the preceding diagrams.

This river water presents an admirable illustration of the influence of vegetable matter on the once purified water of the great lakes; since it increases in its albuminoid ammonia to a point even higher than the Arnprior waters in two rivers, both flowing from virgin soils, situated on the Laurentian rock formation. That these river waters do at times become intensely dangerous when contaminated with sewage, even slightly, is seen in the historic fever epidemic of November and December, 1887, in Ottawa, where 1,500 cases occurred in six weeks. Several small private drains had contaminated the water in the aqueduct. This danger may likewise arise in the future at Parry Sound, where

it will be seen the vegetable matter may be in large amount, while with certain winds, the water is swept in a current to the point of the water-intake. As the town is built on both sides of the river, on rocky soil, sewage will gradually, as the town grows, find its way to the river ; and at certain seasons, notably in the autumn, the Ottawa calamity may repeat itself here.

Amongst the highest degree of vegetable contamination reached in these analyses is that of the Scugog River at Lindsay. It flows from a shallow marshy lake with much drowned land ; and was taken from under the ice when oxidization does not go on to any notable degree. Becoming warm in the summer, this may, and if not purified by filtration, will almost certainly be productive of trouble.

In connection with these chemical analyses, bacteriological analyses of the same waters have also been made wherever possible. Some of these contained in the following tables studied in relation to possible dangerous pollution are of much interest. The chemical analyses of Berlin water consisted of samples from the city water supply and two samples from suspected wells. The bacteriological analyses showed that the city waters, sample 1, contained only 200 bacteria per cent. ; whilst the two wells Nos. 3 and 4 contained 18,000 and 34,830 respectively.

On account of a considerable epidemic of typhoid at Port Elgin, Ont., in autumn of 1891, a bacteriological analysis was made of a number of wells in the town. As there was only a small quantity of water in each sample, a chemical analysis could not be made ; but there was sufficient to allow of a determination of chlorine and a comparison of the parts per million of chlorine with the bacteria per cent. to give some interesting results.

They were as follows :—

Port Elgin Waters.

No.	Bacteria per Cubic Centimetre.	Chlorine in parts per million.
1	10,300	60
2	15,255	14
3	885	6
4	188,145	15
5	282,500	84
6	7,060	130

As all these wells were practically from the same water bearing stratum, we may reasonably assume that the minimum amount of chlorine most nearly represents the normal. This was No. 3 with 6 parts per million, and we find the bacteriological results bears out this supposition for No. 3 had only 885 per c.c., a fairly low result for a well water. On the other hand all the other wells were much higher in chlorine and also in the number of bacteria per c.c.

During the summer of 1891 a number of bacteriological analyses were made of lake water at Toronto in connection with the investigation of lake currents. These throw some light upon the distance to which bacteria may travel, despite the claim that sewage pouring into a large body of water like Lake Ontario must be so enormously diluted as to render it harmless. On July 1st the wind on the Bay at Toronto was mostly strong from the east, thus setting the bay water toward the western gap. On the morning of 2nd it shifted to the north and blew lightly from that direction for about eight hours. The results are as might be expected. The continuous easterly winds had cleared the eastern

part of the bay of contaminated water, and the eastern gap only showed 180 bacteria per c.c. on the morning of July 2nd. Still the northerly wind had its effect and we find one mile south-east of the gap 86 per c.c. and one mile south-west 92, only a reduction of about ½ in travelling a mile with a light wind. Results on July 6th are equally instructive; the wind on July 3rd was mainly south-west and west, blowing a gale; on July 4th, most of the day west 20 miles an hour; and on July 5th, west to north-west, about 20 miles an hour. The effects of this wind are to set the current of contaminated water from the bay out through the eastern gap, and our bacteriological results are as follows: Eastern gap, 1,100 per c.c.; south-east of east gap, 1 mile, 570 per c.c.; south of east gap, ¾ mile, 702 per c.c.; south-west of east gap, ¾ mile, 534 per c.c., results tallying well with those of July 2nd.

On July 8th similar results were obtained. The wind was as follows: July 6th, mainly west; July 7th, west, shifting to north and holding north most of the day, as well as the early part of the 8th. Bacteriological analyses gave eastern gap, 11,200; south-east of eastern gap, 28,000; south of eastern gap, 12,096.

We must recognize from these figures the possibility of the transportation of sewage for a considerable distance with very slight diminution of bacteria, dependent upon its presence.

No bacteriological analyses were made of Windsor water, but the results of the analyses of Lake Ontario water quoted above certainly have a bearing on the contamination of Windsor water supply by Walkerville sewage; for if we find contaminated water from Toronto bay carried out, say a mile into Lake Ontario without much change in bacterial contents and by only such currents as are developed by winds, much more must we accept such a possibility where we have a rapid and continuous current such as is present in the Detroit river, with a sewage outlet directly in a line above the water-works intake.

At St. Thomas, the water supply is obtained from Kettle Creek, filtered by means of Hyatt filters. The Hyatt system consists in the addition of a small quantity of alum for each gallon of water before filtration, thus clarifying it considerably by the formation of a precipitate. It is claimed that this precipitate in falling entangles and brings down with it the bacteria, so that they are more easily removed by filtration. The filtration takes place through sand contained in large horizontal cylinders, provision being made for the reversal of the stream of water once in 24 hours, so as to thoroughly cleanse the filters.

In St. Thomas there are two of these filters, each with a filtering capacity of 500,000 gallons, and they are at present putting in an additional one. The following are some of the results:

		Bacteria.
July 3rd.	Before filtration	45,000 per c.c.
	After filtration	90 "
Oct. 23rd.	Before filtration, average	1,240 "
	After filtration, average	44 "
	Pumping at rate of 1,324,800 gallons per 24 hours.	
Oct. 24th.	Before filtration, 10.30 a.m.	1,240 "
	Water at 10.30 a.m., filtered through Filter No. 1, cleaned at midnight	59 "
	Water at 10.30 a.m., filtered through Filter No. 2, cleaned at 10 a.m.	270 "
	Mixed water at 11 a.m., filtered through both filters	65 "
	Pumping at rate of 810,720 gallons in 24 hours.	
Oct. 26th.	Before filtration	1,545 "
	After filtration	70 "
	Pumping at rate of 794,880 gallons in 24 hours.	

These results show a high degree of efficiency in the filters as in the case of the examination of Oct. 23rd. The pumps were sending water through the filters at a rate about ¼ quarter as fast again as their capacity allows for good filtration.

CHAPTER IV.

OUTBREAKS OF DISEASES.

With the absence of more than localized outbreaks of contagious diseases, except in the matter of Diphtheria, the work of the Board during 1891, was as will be gathered from the various special reports published in Part II., devoted especially to the investigation in the laboratory of special and peculiar outbreaks of disease, and to the examination into the location of public water supplies and the analyses of their waters, and to assisting municipalities where systems of sewerage were under consideration.

This work possesses in the highest degree the characteristics of preventive medicine. Supply a town with a wholesome water in abundance, banish all local supplies, as contaminated wells, and give it a modern system of sewerage properly constructed, and it will be found that epidemics of preventable filth diseases have become practically eradicated. This may be said with truth, since if these two things are supplied, a city is almost certain to be supplied at the same time with a vigilant medical officer of health, with modern ideas, who will by promptness check any occasional outbreaks at their beginning. This is seen in the notable progress in the Province during the year of the establishment of wards, or better, of separate hospitals to which first cases of diphtheria and other diseases can be removed. The necessity for such hospitals has constantly been urged by your Board, and arguments will again be found in the report subjoined, of the Secretary presented at its last quarterly meeting.

FEBRUARY 2ND, 1892.

To the Chairman and members of the Provincial Board of Health :—

GENTLEMEN,—In presenting to you a report of work for the quarter passed since last meeting, I beg to first recall your attention to various matters of importance, then considered.

Small Pox.—It will be remembered that just at that time the action of several state and city boards resulted in having a quarantine inspection established over trains passing from Canada into Michigan, both at Sarnia and Detroit, owing to fears that small-pox might pass through Ontario from the Province of Quebec. You will also remember the protest of your Secretary, published shortly afterwards. I may say that, from whatever cause, the quarantine exercised, as seen from the instructions issued by the Marine Hospital Service were for an inspection of a nominal character. If inspection were unnecessary their only use would seem to have been to interrupt traffic ; if necessary, the inspection being only partial and applicable to persons coming from the affected Quebec counties, was useless, since passengers from these counties only required to buy tickets first to Montreal, and thereafter new tickets, and so evade inspection. With a view to having what seemed to me an unreasonable quarantine removed, I went subsequently to Montreal and had a conference with the Inspector of the Marine Hospital Service sent to investigate the outbreak, along with the Provincial Health authorities of Quebec. After a careful investiga ion of all the statements made to him with regard to the facts he telegraphed favorable reports to Washington as to the state of affairs, and subsequently proceeded to the infected centres, and made his report thereon, it being published in the Bureau Report, a copy of which is presented herewith. It is with pleasure that I state as you see from this, the last bulletin of the Quebec Board, that every case has disappeared from that Province. With the wide dissemination of first cases in October, it may fairly be said that a serious outbreak of small-pox was never more promptly stamped out than this has been. In only two instances did it spread from the primary centres, only once from the primary municipalities, and never outside the Province of Quebec, though in all there were 143 cases. It is to be hoped, that henceforth, no fears need ever be entertained either in Ontario or in the United States that small-pox will reach them from Quebec.

Diphtheria.—It will be remembered that at our last session the newspapers of Toronto and the Local Board of Health, were filled with alarm at the epidemic progress of diphtheria in the city, and that a resolution was adopted by this Board after an interview with representatives of the Local Board seconding the latter's efforts to cope with the disease.

How serious the outbreak has been is seen from the death-rate for :

	Deaths.	Cases Reported.
November 1891	68	..
December 1891	36	..
January 1892	20	..
February 1892	22	..

A temporary isolation hospital was established in which 226 patients have been treated to date, and in which there are still 46, not including a certain number of cases treated in the General Hospital. (Deaths 27.)

As in all outbreaks, especially in towns and cities, it has proved a matter of great difficulty to prevent the transmission of the infection by means of school children. Either the children have returned to school when infection still existed in their throats, or they bore it there on their clothes, which, if once disinfected had become re-infected in the house which had been but imperfectly cleansed. Where families live in small houses, it would seem practically impossible to thoroughly disinfect a house and contents, at least in winter, without transferring the inmates for a day or two to another building.

So many illustrations of this can be obtained from the Board's correspondence, in addition to what is within the experience of every practitioner of medicine, that it might be laid down almost as a law. This being the case, I may be excused for adverting to what this Board has so strongly urged for years, viz. : the widest application possible of the idea of removal of first cases from houses where other children are.

1st. For prevention of second cases.

2nd. For economy of time and money in treating cases.

3rd. Economy of time and money in the troublesome work of disinfecting, re-papering, etc. If an estimate could be made of the aggregate expenditure which this last item alone has involved in Toronto within three months, the amount would surprise, if not astonish us.

If then isolation hospitals are so essential to this work, a brief reference to them as existing in England, which has so long been the exemplar of Public Health, may be of interest.

The name of such hospitals, as remarked by Dr. Thorne, in his classical report published by the Local Government Board of Great Britain, is a matter of much importance. All designations, referring to diseases such as Small-pox Hospital, or Fever Hospital, or those bringing the question of infection into prominence, such as Infectious Hospitals, should be avoided. Names, as *Crozier Lodge*, *House of Recovery*, *The Sanatorium*, are given as instances of a practical euphemism. These hospitals are always spoken of as the hospitals of the *Sanitary authorities*.

The same report states that in 1879 296 sanitary authorities had arrangements of either a temporary or permanent character. Dr. Thorne emphasizes the essential advantages in practical results gathered from experience of having such hospitals of a permanent character. In such instances, when the hospitals are in constant use as in populous districts, there is always a permanent matron, a nurse, servants and porters. The nursing staff is increased as occasion demands. Illustrations and drawings are given in the report of hospitals from the larger substantial structures to cottages, huts and tents, made use of in different cities, towns and villages.

In this volume of 400 pages, the amplest information on every detail of cost, management and results is given, and the number of patients treated in many instances is also stated. Naturally, a most conspicuous fact appears, viz., that a very large proportion of the patients were children—notably of those suffering from scarlatina. Since that period diphtheria has notably increased in England, and these cases are now being largely treated in these isolation hospitals. To illustrate the increased use of such hospitals, I quote the following from the report of 1890, issued by the Metropolitan Asylums Board on Infectious Hospitals and Imbecile Asylums.

Although 'Compulsory Notification of Infectious Diseases' previously existed in a large number of towns in England, it was not till 1889 that the General Infectious Diseases (Notification) Act was passed.

The following total of notified cases is given for the 5 notification districts for 53 weeks ending January 3rd, 1891 :

Smallpox	60	Typhoid Fever	2,877
Scarlatina	15,330	Cholera	25
Typhus	35	Erysipelas	4,598
Relapsing Fever	7	Puerperal Fever	206
Diphtheria	5,870		
Membranous Croup	550	Total	29,795
Continued Fever	237		

Or nearly 6 in every 1,000 of a population of 5,000,000. Various statements made indicate that owing to divided jurisdiction, a very considerable number of cases were not reported to the Board.

The total number of patients under treatment during the year was 10,123. The total admissions were 8,334, as compared with 5,772 in 1889. 'This increase in the number of admissions was probably due, not to any unusual prevalence of scarlet fever in the metropolis . . but to the increased favor with which the Managers' Hospitals are generally regarded, and to the increased efforts to secure isolation of infectious cases on the part of the various local sanitary authorities.'

The mortality at various ages of 36,849 cases admitted into the Board's Hospitals since opened was only 9.97 per cent. Over 50% of these occurred in children under 5 years of age, and only 4.76 per cent. died in patients over 15 years of age.

The report states, "Such results are sufficient to prove how essential it is that every precaution should be taken to prevent the exposure of young children to infection, and they effectually dispose of the once popular notion among ignorant people that it is better to suffer from the disease while young."

To show the terrible fatality of diphtheria, though only about 3% of the total admissions were of diphtheria, viz. : 942 cases, in 1890 there were 316 deaths, or 36.07%, while that from scarlet fever was only 7.79%. The remark is made that diphtheria previously but seldom admitted, is owing to its increasing prevalence in London, being isolated yearly more and more. That it is comparatively not so prevalent in England as in Canada and the United States is seen from the fact that there were but 1,588 cases in all London in 1889.

These various statistics become of interest as showing how appreciative are the sanitary authorities in England of the value of life, and of the cost of epidemics. That the views which this Board has for years held and disseminated are those of the highest sanitary authorities is admirably illustrated by a paper discussed before the Sanitary Institute of Great Britain in 1887, on "Organization and Administration for the Control of Infectious Diseases," by John F. J. Sykes, B. Sc., Medical Officer of Health for the London District of St. Pancras.

Eliminating the treatment of individual cases, he deals only with "those measures which with a proper organization can be actually carried out in a systematic manner and on a comprehensive scale by medical officers of health."

He divides infectious diseases as follows, and their treatment as follows :

Temporary Provision	Cholera	Special Epidemic Disease.
Hospitals	Smallpox Scarlatina Typhoid Fever Typhus " Continued " Diphtheria	Major Infectious Diseases.
Homes	Measles Rotheln Whooping Cough Mumps Chicken Pox	Minor Infectious Diseases.

And then says, "All these diseases should with advantage be excluded from general hospitals, and come properly within the scope of isolation hospitals."

Smallpox should be treated in an isolated building at a distance from others. In London it is treated in Floating Ship Hospitals on the Thames.

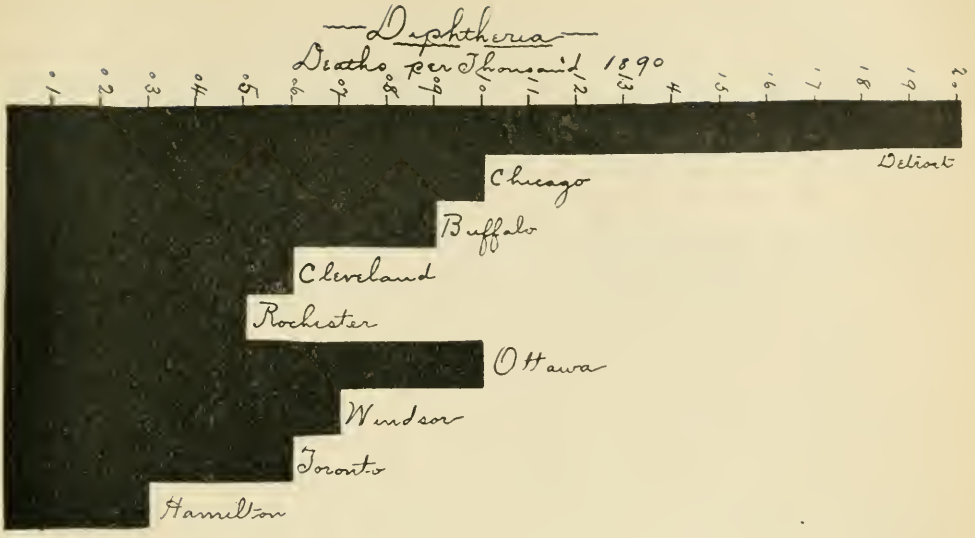
Scarlet Fever "would be more advisedly treated in a building separated somewhat from the general Fever Building, or in a separate wing"

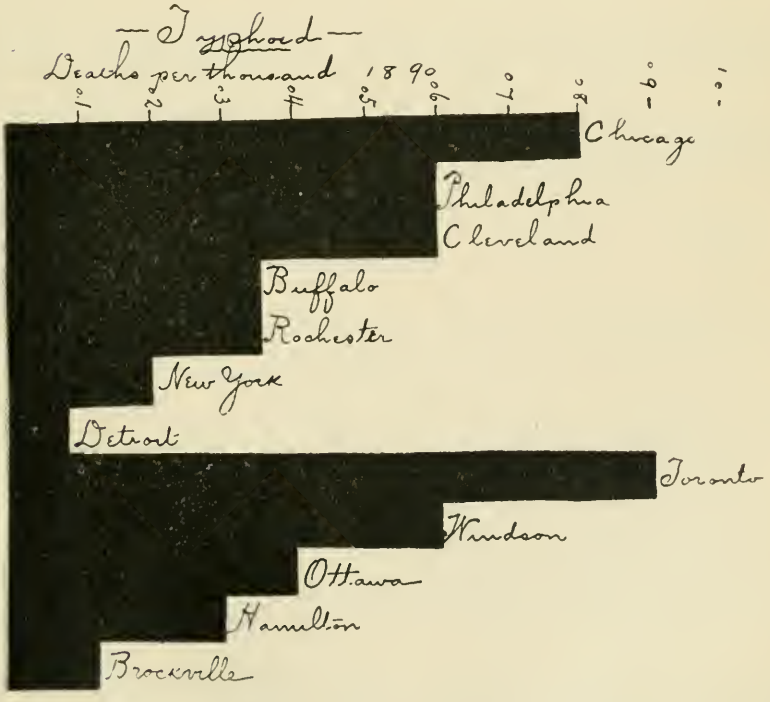
He places diphtheria under the heading of general fevers and says, "These might, with advantage, be treated in a single building, possibly in separate wards." Regarding situation he says :

"Isolation of the whole hospital or sanatorium must have regard to two points : Firstly, that it should be removed from dwellings ; secondly, it should be out of the track of ordinary traffic."

The success of the whole work depends upon notification of cases, since as our officer's duty is to protect the community against an epidemic of infectious disease, that duty obviously cannot be carried out unless he is informed betimes of it presence." Thus notified, he does his duty :

"1. By watching the approach of an epidemic, to make timely provision.


Diphtheria
Deaths per Thousand 1890
·1 ·2 ·3 ·4 ·5 ·6 ·7 ·8 ·9 1·0 1·1 1·2 1·3 1·4 1·5 1·6 1·7 1·8 1·9 2·0
Detroit
Chicago
Buffalo
Cleveland
Rochester
Ottawa
Windsor
Toronto
Hamilton


Typhoid
Deaths per thousand 1890
·1 ·2 ·3 ·4 ·5 ·6 ·7 ·8 ·9 1·0
Chicago
Philadelphia
Cleveland
Buffalo
Rochester
New York
Detroit
Toronto
Windsor
Ottawa
Hamilton
Brockville

"2. By ascertaining the cause of the epidemic, to prevent its continuance or recurrence.

"3. By disinfecting, to prevent the house, etc., being a constant source of infection.

"4. By removing those patients certified by their medical attendant to be without proper nursing or isolation, in order to prevent them becoming centres of infection."

Regarding the latter he points out that there are three methods for preventing the spread of infection :

"1. Removing the infectious from the healthy.

"2. Removing the healthy from the infected.

"3. Boycotting the family or household."

Regarding these, he says of the third, as in the case of closing workshops, factories, shops, etc., "it is ruinous and iniquitous, unless compensation be allowed. Local bodies are not given to generosity, and compulsory compensation would lead to endless difficulties."

"The second may be adopted under better circumstances by the healthy betaking themselves betimes elsewhere."

"The first course, namely, removing the case to hospital, is the kindest one to adopt under these circumstances."

Regarding individual objections to the latter, "Dr. Littlejohn, of Edinburgh, reported in 1882, that there were 7,063 notifications . . . and that in not one of the instances was it necessary to use the compulsory powers possessed for the removal of patients."

I have dealt at some length with this subject of isolation, since it has happened that during the period since the last meeting of the Board, the Regulations then adopted with regard to diphtheria have become law by an Order-in-Council, dated Dec. 23rd, 1891 ; and already the good effects of this order have made themselves felt, by the daily reporting to the Board of outbreaks in different parts of the country, which without the Order, would in many cases never have been reported, and the decision to erect permanent isolation hospitals has been come to in at least two instances.

As will be gathered from the correspondence, a number of other important subjects have come up for action. And among them will be submitted the specifications for public waters supplies at Arnprior, and Parry Sound. The plan of a sewerage scheme for London will also be presented, and reports *re* water-works in several other towns.

That even watchfulness on the part of a Medical Health Officer fails to prevent the prevalence of diphtheria and typhoid where the two requisites of good water and sewage are wanting, may be seen in the unfortunate statistics of deaths for instance in Guelph, as compared with a town like Brockville, which has complete systems of public water and sewerage.

Comparison between deaths in Guelph and Brockville :

	Guelph.	Brockville.
Diphtheria	39	0
Typhoid Fever	1	2

That such differences will result sooner or later in the commercial retardation of the one and the proportionate advancement of the other is made apparent, when the value of lives lost and the expense of sickness are taken into consideration.

From the preceding comparison if we estimate the loss of time in sickness and nursing on some assumed value, such as as a fortnight's sickness in diphtheria, and the loss of time of a nurse, we will see that a very great loss was incurred by Guelph which to Brockville was saved. Can any one question which city will attract manufacturers and additional residents.

That your board has very properly been required by law to investigate existing and proposed systems of water supply is illustrated in the following diagrams, and further by dangers, which are illustrated in the report on the Windsor and Walkerville water supply and sewerage difficulty found in Part II. If one municipality adopts the most convenient and economical method of sewage disposal without due regard to the safety of its neighbor's water supply.

The diagrams would seem indeed to teach us, if we compare for instance, Chicago and Toronto with Detroit and Buffalo, that law of pollution exists, viz : *That taking a series of years, the pollution of even relatively large bodies of lake water, which having no regular flow, are liable to carry sewage to a water intake, will at certain seasons and with winds moving sewage towards the point of supply, cause outbreaks of typhoid of a more or*

less epidemic. I further believe that we can establish from these diagrams another law, viz: "*That in cities obtaining practically all their drinking water from a public supply, whose source is beyond the possibility of contamination typhoid fever will practically disappear from the list of causes of mortality.*"

Water Works System of Sewage.—During the year the Board has investigated specially the water supplies of Windsor, St. Thomas, Chatham, Woodstock, Georgetown, North Toronto, Toronto, Essex Centre, Trenton, Galt, Lindsay, Arnprior, Leamington, etc,, and the sewerage systems, either proposed or under construction, of Berlin, Brantford, Walkerville, West Toronto, Peterborough, St. Mary's and Barrie.

Each of these presents some distinctive features, as may be gathered from the special reports thereon; but two facts are apparent, viz:

1. That in all new sewerage systems in Ontario, the separate system is that which is being adopted as both the most sanitary and economical.

2. That Canadian engineers are in every way possible endeavoring to construct works, as regards sewage disposal, in conformity with the principles taught and encouraged by the Board, and upheld by the Public Health Act, by which the rights and interests of the citizens of neighboring municipalities are protected to the fullest extent. (*Vide* reports on Berlin, Brantford, West Toronto, Peterborough, etc.)

It is further most gratifying to know that in no case have the views of the Board in this matter been challenged as regards their wisdom from the practical standpoint. When in civil cases our judges are deciding that a neighbors privy in a city is a nuisance and does violence to civic decency, and orders its removal, we need not fear but that they will promptly insist that the larger nuisances of sewage shall not be allowed to pollute a neighbor's drinking water.

Animal Diseases.—As will be seen in the special reports found in Part II, the year has been an active one in the field of contagious diseases of animals. The report for 1890 dealt at some length with the character of actinomycosis and tuberculosis in cattle. With regard to the former, the summary of laboratory work will show that the investigation of the disease has become of much interest in the Province. Its presence in many sections was indicated last year, while this year several cases have occurred where this Board and the Local Boards have taken active measures to prevent the transit and sale of animals affected with it. The true character of the disease as regards its transmissibility from animal to animal, is causing much discussion; but it would seem as if the same arguments which so long prevented tuberculosis and leprosy from being considered as contagious are still being used to blind the public as to the true character of actinomycosis. If popular observation, which in the long run is not far wrong, be taken for anything, the repeated occurrence of actinomycotic animals in the same herd, after first cases have been introduced, ought to weigh strongly with every practical person on the side of its contagiousness from one animal to another. The matter of degree is the only question which seems to have a practical bearing in the matter.

The report on the outbreak of anthrax at Acton on the flat lands along a creek below a tannery has once more brought this disease into prominence. Its true character was early established by laboratory investigation and the conditions of its introduction into the neighborhood were fully investigated. Information was further obtained of the reappearance of the disease on the flats along the River Speed at Guelph where it first appeared five years ago. The persistency of the disease, once seeded in these places illustrates in a remarkable manner the persistency of the spores of many cryptogamic forms of life, when once introduced into a district. Diphtheria and typhoid, rust and the black-knot, mildew, etc,, are common illustrations of the fact,

The instances of the Acton tanneries, the Neustadt tannery, especially point to this common source of nuisance as demanding special attention on the part of the Board. This class of industry is likely to grow in the Province, and unless these establishments are arranged on a proper sanitary basis of construction at first they are sure sooner or later to become sources of trouble to local sanitary authorities.

New Cemeteries.—During the past year there have been a number of applications to the Board for permission to establish cemeteries, commonly at points adjoining old ones within the confines of an incorporated town or village. In the several instances submitted to the Board there has been evinced an intelligent appreciation on the part of their communities of the sanitary questions involved. The sites selected have in every case been free from the objection of endangering through drainage local water supplies.

Many of these municipalities, originally incorporated much larger areas for building purposes than their progress has demanded, and there is no reason why, under the safeguards established by law requiring the submission of these sites for the approval of the Local and Provincial Boards, vacant sites within corporations should not be thus utilised.

Inspection of Milk Supplies.—The anxiety to have public milk supplies improved in quality and in wholesomeness, has caused this subject to receive much attention from Local Boards during the year. The work done on this subject by the Board during the year will be found summarised in the paper found in Part II of the Report, which was presented by your secretary to the American Public Health Association in October last. The possibility of Health Officers, medical and sanitary, examining by a reliable test, frequently and rapidly, samples of milk taken from the waggons of dealers, is becoming understood, and in such apparatus as the Babcock tester has been found the solution of what has hitherto proved the greatest stumbling-block to progress in this work. The investigations of the sanitary conditions of the animals, stables and water supply, and of those engaged in handling milk, is however, a work of such magitude that much requires yet to be done even by our most progressive Boards, ere it can be said that this work is abreast of the work in other branches of sanitary work.

Transportation of the Dead.—The question of transportation of dead bodies by train, has been the subject of frequent correspondence with railway and municipal authorities The Board has on several occassions expressed its views on this matter, and as seen in its last expression of them, inclines more strongly than ever to the view that the public interests demand that public sentiment in the matter of burials shall so change that the idea of transporting any dead body, but especially those dead from infectious disease, will be completely given up.

It is unfortunate that the undertakers have not by legislation been placed in such a position as to be brought directly into sympathy with the work of this Board, as no stronger auxiliary is possible in the work of limiting disease than the co-operation of the members of an association to whom is consigned the duty of conducting the last rites, in all instances, but especially where the deceased had suffered from contagious disease.

Spread of disease by School Children.—The question of attendance at school of children who have recently suffered, or who go from houses where contagious diseases exist, has, owing to the many outbreaks of diphtheria during the past year, taken a position of the greatest prominence in the eyes of the public, and none too soon. As the Board has before had occasion to remark, there is no single cause which probably contributes so largely to the dissemination and continuance of this pest as the introduction of contagion into the school-room. Not only is the air of a school-room commonly contaminated with carbonic acid in excess, owing to over-crowding, but, the dust, composed of particles of every kind borne in on the clothes, boots and person of scholars and kept continually in motion owing to the movement of many feet on the too often defective floors, is constantly being inhaled, and coming in contact with throats which, irritated by dryness of air, from defective heating, and which if containing the germs of contagious disease, cannot fail to inoculate the children.

How the matter is to be thoroughly remedied with the disinclination which exists on the part of many trustees to incur even a small expense for any more modern method of ventilation and heating, is a matter to which the Board may very well devote its attention to.

The following from a County inspector, is, it is to be hoped, an exceptional illustration of the attitude held by some school trustees on the subject of ventilation.

London, January 21st.

Dr. P. H. Bryce,
Secretary Provincial Board of Health,
Toronto.

Dear Sir.—To point the need of unrelaxed efforts to educate or compel people to ventilate public buildings, I quote the following resolution adopted at an annual school meeting held on the 30th ult.

"Moved and seconded, that a vote be taken of those present how they feel on ventilating the school-house. Twenty-eight against it and one for it.

I am,
Yours very truly,
J. Dearness.

Nuisances from Mill Dams.—Another subject of more than ordinary importance, due not only to the interests involved, but to the difficulties in the way of finding some satisfactory method of removing the evil while giving due consideration to individual interests, is that of the effects of dams, booms and slides constructed on streams either for transport of logs, or for milling purposes.

The South River difficulty reported upon in 1890 still remains a *questio vexata*, while others such as that at Huntsville, Caledonia, etc., must soon demand that attention be paid to the hardships of the many sufferers from drowned lands and malaria, who are riparian owners above these dams.

County Health Officers.—These evils, which exist most generally in the newer districts of the Province where lumbering is carried on extensively, call for remark on another question, which as seen in the correspondence of the Board is attracting much attention there. This is the question of County and District Medical Officers of Health. If the case of Muskoka be taken it will be seen that with only three or four settlements of any size in the whole area, medical men are scattered and far apart. Some small settlements are more than twenty miles from a medical man; while the distance is often doubled in the districts still further north. My recommendation made to the Board at the time of the great epidemic of diphtheria in Parry Sound District in 1889 will be remembered. The dying out of the epidemic left the question in abeyance; but it is quite clear that some extended treatment of the subject by the Board is imperatively demanded.

Probably the scheme then outlined, with the further addition of appointing one or more District Medical Health Officers, is that which will be found to most adequately meet the needs of the case and it is respectfully submitted for the Board's consideration.

Interstate Notification.—During the year the practical working of the Interstate Notification of infectious diseases has been shown; several instances having occurred where this co-operative work was called into action. As regards Ontario, it was principally with the Province of Quebec on the east, and the State of Michigan on the west. Smallpox having unfortunately broken out in Quebec simultaneously in several counties owing to infection from one centre, this Board, as also other Boards, co operating under the agreement, was apprised of the fact, and of the measures being taken for its limitation by the Quebec Provincial Board. So distant and isolated was the seat of the outbreak, and so thorough were these measures, and so regularly were the weekly statements of the progress of the disease received, that your Secretary felt that no occasion had arisen which called for special protection, quarantine, or inspection measures on the part of your Board—the correctness of which opinion events have fully justified. That the State Board of Michigan did not feel this confidence is seen from the subjoined correspondence, and from the action taken by it in calling upon the Marine Hospital Service to institute an inspection on the western confines of Ontario.

Your Secretary took such action, as to him seemed proper, not alone to defend the Province from the imputation of either harboring small-pox within its borders, or being unobservant of events in Quebec; but alone from the injury which such an inspection might have upon the interstate commerce and traffic which has attained such extended proportions. It is with pleasure that it can be stated that the Marine Hospital Service took the most prompt steps to inform itself of the actual condition of affairs in Canada, by sending an officer to Montreal, and thence eastward into the infected districts. His report was most commendatory of the thoroughness of the Quebec Provincial Board and of the activity of its medical staff; and resulted in a prompt removal of the irritating inspection at Sarnia and Detroit. The special correspondence relating to this matter will be found under Part II of this Report.

In the preceding portion of this chapter I have at some length referred to the history of sanitation during the past century, and to some of the special matters which have come under the attention of the Board during 1891.

If the latter indicate that there still remains much work to be done before we have advanced even to the doorway of the sanitary Elysium, yet a single reference to the Tables, as published, of the St. Lawrence quarantine, found in Chapter I, or to the detached and imperfect records of cholera in Canada, is enough to indicate that as regards those diseases whose appearance in past ages has been the signal for increasing fear and general panic, the past century, and notably the last quarter of it has in civilised countries been in large degree freed both from these pestilential diseases and the terrors engendered by them.

To expect that we are free of, or to be freed from disease is not to be hoped for; but manifold are the elements, which, nevertheless, even as imperfectly known to us, enter into the problem of what the sixth commandment requires of us, and of that which philanthropy prompts us to strive for, to give lights to the sons of men.

Ever since fabled Prometheus was chained to icy Caucasus for stealing fire from Heaven that the sons of men might find light and heat, the struggle between the elements of life and death has gone on. Victory too has ever at length ridden aloft on the car of the Destroyer; but life, many-fountained and mysterious, seems ever to renew the struggle, deriving new strength and more adequate weapons from Nature's arsenal, slowly yielding up her priceless stores.

Were Life in her infinite manifestations wholly known, then there were a possibility that man might gradually and at length establish a complete harmony between his life and its environments, and that human existence would be one, in harmonious cadence with the music of the spheres; but as yet night lingers, though there be not wanting even now auroral blushes of the rising of a brighter day.

With electricty, the new found power chained to the car of human progress, with the atmosphere, steam and other gaseous forces performing each its manifold duties under man's guiding hand; with earth and water yielding hitherto unknown elements and compounds effecting under the transforming alchemy of the human intellect, almost infinite, and truly marvellous results, it is not saying too much when we say that year by year will develop in preventive medicine defences so strong that with reason we may hope to behold an euthanasia as glorious and to see man's life accomplish its cycle as complete as when autumnal leaves untouched by frost fall to the ground glowing with the ruddy hues which mark a complete life.

Respectively submitted,

PETER H. BRYCE, M.D.,
Secretary.

PART II.

SPECIAL REPORTS.

REPORT OF DELEGATE TO INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY: LONDON, 1892.

To the Members of the Provincial Board of Health:

GENTLEMEN,—It will doubtless be interesting to you to listen to a report of the work done, at the International Congress of Hygiene and Demography, which met in London from August 10th to 17th, inclusive.

I hope I may be permitted to premise by saying that by demography is understood the study of the life conditions of communities from statistical points of view. As you are aware, six congresses have already been held: at Brussels, Paris, Turin, Geneva, the Hague and Vienna. You recollect the very full report given of the Congress at Geneva by our colleague, Dr. Covernton, which appears in the Annual Report for 1883.

The Seventh Congress was inaugurated on Monday 10th of August, at half-past three in the afternoon by a general meeting in St. James Hall, the chair having been taken by H. R. H. the Prince of Wales. About 2,300 persons, many of them ladies, were present. Sir Douglas Galton having presented the report of the Permanent International Committee, the Prince of Wales proceeded to read the presidential address.

Premising by expressing the pleasure it gave him to preside, and thanking the members, more particularly those who came from a distance for their attendance, he alluded to the importance of the meeting as shown by the list of its officers, both honorary and active. He then alluded to the knowledge he had acquired of the benefits arising from sanitary methods, when he was a member of the Royal Commission on the dwellings of the working classes; and expressed his satisfaction, that the registers of the country bore witness to the decreasing mortality in the large towns, to the increasing length of life in the whole population, and to many facts proving the great influence of sanitary institutions. He expressed the hope that the deliberations of the Congress being free from general or municipal politics, would exercise such an influence on public opinion as to induce individuals to submit to changes which appeared inconvenient or injurious to them, because they would be really beneficial to the general community.

He hoped that the influence of the Congress would reach all people and all classes; for while the heavier penalties of insanitary arrangements fall on the poor, who are themselves least able to bear or prevent them, yet no class is free from their dangers or sufficiently careful to avert them.

Dr. Brouardel (President du Comite Consultatif d'Hygiene Publique de France, Doyen de la Faculte de Medicine, Paris) replied in French on behalf of the French delegates.

Dr. Von Coler, Director General of the Medical Department of the Prussian Army replied in German for the German Government.

Professor Corradi of Pavia replied in Italian for the Italian Government. Dr. Roth of the German Army spoke on behalf of the German Committee of the Congress. Herr Joseph Korosi, Director of Municipal Statistics, Budapest, in his reply dealt principally with the condition of statistical demography, the origin of which he ascribed to England.

Sir James Paget dealt with the mischievous fallacy that some of the subjects set down might seem of little utility. He showed that brilliant practical results were sometimes obtained from most unpromising fields of labour. The discoveries of Pasteur which had afforded facts and lessons of the highest practical importance to medicine and hygiene, grew out of his study of alcoholic fermentation. It was curious to reflect that the study of a process, which was responsible for so large a part of the disease and of the suffering of the human race, had resulted in discoveries which had done so much to diminish the sum of suffering among men and animals. Much had been done in England by the Medical Department of the Local Government Board, but much remained to be done. He hoped that the voice of this Congress would make it clear to every Government in the world, that it was part of its duty to promote the cultivation of the deepest scientific research, as much as it was to promote the ordinary routine work necessitated by sanitary progress. He concluded by moving a vote of thanks to the Prince of Wales for presiding. Dr. George Buchanan (Chief Medical Officer to the Local Government Board) said he would not detain the meeting long in seconding the resolution, which reflected the opinion of everyone present. The resolution was then put by Sir James Paget, and carried by acclamation.

The Prince of Wales in reply thanked Sir James Paget for his courteous words and expressed the interest he felt in the addresses which had fallen from the lips of the distinguished foreign delegates who had addressed them. He congratulated the Congress on the large attendance of delegates, particularly from abroad, and hoped that the interchange of ideas between Englishmen and their friends on the matters of importance to be discussed would, if a just conclusion could be reached, benefit not only England and English cities, but other countries

also, by introducing such sanitary measures as tend to decrease disease throughout the world. Should this result be attained, he said, we shall not have lost time in the work which we are going through this week.

The Prince of Wales spoke in an easy conversational style, and while not attempting more than generalties, produced a favorable impression. His manner is hearty, his voice strong and well modulated, his accent elegant without being markedly English, and the effect of his address satisfying. He certainly appears to have many of the qualities which go to make a man popular in t is democratic age.

The sectional meetings took place on the 11th 12th, 13th and 14th of August, from 10 a.m. to 2 p.m. in the rooms of the Royal and other learned societies at Burlington House, Piccadilly, at the University of London, Burlington Gardens, and the Royal School of Mines, Jermyn St. Section 1, hygiene, was presided over by Sir Joseph Fayrer. Section 2, bacteriology, by Sir Joseph Lister. Section 3, relations of the disease of an mals to those of man, by Sir Nigel Kingscote. Section 4, infancy, childhood, and school life, by Rev. Joseph Diggle, M.A., Chairman of the London School Board. Section 5, chemistry and physics in relation to hygiene, by Sir W. E. Roscoe. Section 6, architecture in relation to hygiene, by Sir Arthur W. Blomfield. Section 7, engineering in relation to hygiene, by Sir John Coode. Section 8, naval and military hygiene, by Lord Wantage. Section 9, state hygiene, by Lord Basing. Division 2, or demography, was presided over by Mr. Francis Galton.

A full report of the papers read, and the subsequent discussions which took place in the several sections would require several volumes, there being in all 249 papers. I may say that my attention was confined almost entirely to the department of State Hygiene, and the remarks which I am about to make will necessarily refer to what took place in that section.

The Right Hon. Lord Basing opened the proceedings by reading the President's address. He said that, though he made no pretensions to the character of an expert, he had great pleasure in accepting the presidency of this section; having when President of the Local Government Board, been associated with the growth, of our sanitary legislation and administration, "such as it was." England had never any complete code,—our system had grown and ripened from experience, beginning with the grant of special powers to the greater municipal authorities, especially that of borrowing money for public work, and ending with general Acts conferring like powers on all local authorities. He traced the progress of sanitary legislation from 1832 to the present time; observing how each successive visitation of cholera had given a fresh impulse to public opinion, and referred to the services of the late Sir E. Chadwick, and Sir John Simon His own connection with the work dated from the passing of the Public Health Act of 1875, the first attempt at a codification of the law for the whole country, with the exception of London, which had to wait until the present session.

England had now in the President of the Local Government Board a Minister of Health in spirit if not in name, assisted by a body of able experts, and he was inclined to prefer the existing association of the Poor Law and Public Health services to the separation advocated by some. The British public was opposed to anything that savoured of bureaucracy, and, however desirable from a scientific point of view, Parliament would not concede further centralisation, assuming the sufficiency of local administration: but he, as a statesman, was in favor of compromise, being convinced that decentralisation was not applicable to those departments of administration that demanded uniformity, and were more or less unpopular. State control was thus indispensable in the cases alike of poor-law and sanitary administration; in the former he was convinced that it could not even now be relaxed, and without it we should never have attained the progress or the results that we had. The unwillingness of the county councils to appoint medical officers of health and to assume the control of the sanitary supervision, of the counties afforded evidence of this, as did the unsatisfactory character of the clause in the Act which conferred on them permissive powers Indeed, he did not think that the time had yet arrived to hand this control over to them, and, as the *Times* recently observed, patience was the great need of all reformers.

Dr. Dudfield, in proposing a vote of thanks to the president, observed that had he, as Mr. Sclater-Booth, had his own way, London would have waited not sixteen, but only two years for a consolidation of its sanitary acts.

The motion was seconded by Dr. Littlejohn, who referred humorously to Lord Palmerston's celebrated reply to the Edinburgh Presbytery on the right way of averting the visitation of cholera in 1853.

Organisation of Local Boards of Health.

Dr. Simon (Breslau) then read in English a paper on the organisation of local boards of health, which he maintained should be distinct from, though subject to, those of local self-government, and under the direction of a physician giving his whole time to the work. In towns with over 300,000 inhabitants there should be several such boards, identical in constitution, but under the direction of one central board and its chief. Each board should be divided

into sections dealing respectively with, (1) sewerage, water supply, and public and private buildings; (2) food supply and adulteration, with, if possible, a bacteriological station; (3) the notification and repression of infectious diseases, and the hygiene of dwellings and schools; and (4) vital and nosological statistics.

Dr. Willoughby, while observing that Dr. Simon approved of the subordination of sanitary to local administration, subject to state control, wished to direct special attention to his other position that the boards of health should be composed more or less of experts. This idea, familiar enough to Americans seemed never to have entered the heads of English people. So long as the sanitary authority was identical with, or was constituted of a mere sub-committee of the local board, little or no real progress could be hoped for. It was owing to the fact that the so-called sanitary authorities were composed of men always ignorant of the laws of health, often opposed to improvement, and not seldom themselves the greatest offenders, that the River Pollution Acts were a dead letter in the manufacturing districts, and that such difficulties were met with in dealing with insanitary dwellings in towns. Boards of health, however elected, should be composed of experts and distinct from, though subordinate to, the local governing bodies

Dr. Cassidy, Chairman of the Provincial Board of Health (Ontario) read a paper on "Sanitary legislation in Ontario for the prevention of epidemic, endemic, epizootic and other contagious diseases. This paper passed in review the whole field of sanitary legislation in this Province from the time of the establishment of the Provincial Board of Health to the present day. The composition of the board, its bacteriological laboratory, and the existence of 576 local boards with 356 medical health officers were alluded to. Attention was also drawn to the regulations respecting vaccination, the use of bovine lymph, and the vaccine farm at Palmerston. The published rules of this board intended to restrict the spread of infectious diseases were also given.

Dr. Coverton, member of this board followed with some remarks showing the benefits which resulted from extending the powers of this board over the municipalities, as was evident during the small-pox epidemic at Montreal in 1885.

Dr. Prince, Boston, Mass., wished to know if compulsory notification was a success in Ontario, and hinted that in Boston physicians neglected to notify the health authorities when they wished to continue their attendance and make fees.

A lay gentleman asked if there was any legislation in Ontario obliging physicians to disinfect themselves. Dr. Whitesides of Belfast, Ireland, stated that there was no small-pox hospital in Belfast and wished to know what should be done with a well-to-do person affected with small-pox.

In reply to Dr. Prince, Dr. Cassidy said that Ontario physicians observed the law of notification. In reply to the layman he stated, that in Ontario physicians had been largely the prime movers in introducing sanitary reforms, and it had not been thought necessary to provide special rules for their disinfection. He thought that they generally attended to that, and were a law to themselves In reply to Dr. Whitesides, he advised the construction of a small-pox hospital at Belfast, and stated that until such a provision were made, isolation could be practised in a hospital tent or the patient's own house, if the other members of the family vacated it.

Sanitary Administration in Dublin.

Sir C. Cameron next read an account of ten years' experience in Dublin where he held a position of authority unique among medical officers of health Nowhere, perhaps, had the internal migration of the better classes and the conversion of their houses into tenements been more productive of insanitary conditions. Even now, of 54,000 families, 32,000 occupied 3,000 houses, and 22,000 the remaining 10,000. The former had on an average but one room and a half. Extensive demolition and though to a less extent reconstruction had been effected, the total cost of the improvements having been over £600,000; but the results were most satisfactory, the general death-rate having been reduced by 14 and the zymotic by 45 per cent. Typhus fever had almost disappeared. The mean corrected death-rate for the whole district, with 357,000 inhabitants, was 26.3.

The State, and Scientific Investigation.

Drs. Tomkins and Wright then read papers on the duties of the State to undertake scientific investigations, and to provide and support laboratories for hygienic and pathological research; but time forbade anything like a fair consideration of the subject by the meeting.

Wednesday, August 12th.

The chair was occupied successively by Drs. Ed. Ritter von Hoffmann and W. P. Ruijsch.

State Control of the Dwellings of the People.

Dr. Elgin Gould read a paper on state control of the dwellings of the people, in which he urged the advantages of systematic inspection and supervision, as practised in the State and City of New York, over neglect in the first instance, and demolition when the conditions became insufferable. The results had been a reduction of the general death-rate from 29 to 24 per 1,000 within the last ten years, and the significance of this reduction was the more striking in that it had been effected concurrently with a considerable increase in the proportion of the population belonging to the working and poorer classes. He preferred relying on systematic inspection of all houses let in tenements, to more than one or two families, to dependence on complaints from private persons. Where all houses alike were thus inspected no jealousy or class prejudices were provoked, and the registration of the conditions of all houses as they were erected was infinitely preferable to leaving the discovery of defects to the chances of illness or death.

Mr. Hamer, of the Mansion House Council on the dwellings of the poor, followed with a paper on the homes of the poor. The connection between insanitary dwellings, ill-health, and a low state of morals was, he maintained, even more close than that between ignorance and crime, and the pecuniary value of life and health was now so generally recognised that he hoped that these claims would not much longer be treated as secondary to the so-called rights of property. Great as were the benefits accruing from local self-government, there were some matters of such vital importance that they could not be left to local caprice, but must be controlled by the State, that is, by the nation as a whole. Such were health and education ; and fresh air and pure water were factors in the former which ought not to be made the objects of commercial monopoly or profit. The reduction in the general death-rate afforded evidence of an improvement in the condition of the masses, but a drive from the city to Tottenham would show that, side by side with the improvement of the older districts, a mass of jerry-built houses, he might say of suburban slums, were growing up which would be a source of danger in the future. As a part of this control, medical officers of health should be state servants and not subject to the owners of property or the local boards, while the whole sanitary administration should be under a Minister of Health.

Dr Theodore Thompson, in a paper on the same question, said that the poor everywhere might be divided into two classes : (1), those who, though with a struggle, maintained a decent existence ; and (2) the loafers, drunkards, and criminal classes. The former were often fairly comfortable, but laboured under the burden of excessive rents. These required treatment differing in several respects.

The existing laws, were however, not enforced as they might be, and the man on whom so much depended was too often ill paid and insecure in his office. But even if he were competent and independent, the law itself was not free from grave defects ; for example, a sewer ventilating into a dwelling-house was not a nuisance within the definition of Clause 9 of the Public Health Act. Nor was the housing of the Working Classes Act by any means perfect. Several economic difficulties attended its execution ; for the workman must be near his work and to a food market, and this was a cause of much overcrowding, which could only be obviated by higher wages, facilities for travel, and lower rents.

Mr. Burroughs's paper dealt mainly with the question of ground rents, and

Mr. Rutherford followed with one urging the expediency of the sanitary registration of public and semi-public buildings by the certificates of competent persons.

In the discussion on the foregoing papers, Dr. Pankhurst said that there was no den so noisome for which rent would not always be obtained : that there was no city in which "unhealthy areas" could not be indicated, or the demolition and acquisition of which could not without much difficulty be secured by an energetic medical officer of health, and that this procedure had been greatly facilitated by the Housing Act. But people who would live in dens, because they were cheap, should be compelled to live in decent dwellings under stringent supervision and discipline at low rates, or even at none at all. It would be a grand education if in each area acquired a portion were thus appropriated, and it would be desirable that under such circumstances the rates should be wholly or partly remitted on compliance with certain conditions of sanitary construction and regulation.

Dr. Louis Parke believed, that local authorities generally showed a better appreciation of their obligations, and he would prefer that responsibility should devolve on the county councils than on the Local Government Board, which, ignorant of local needs and circumstances, was inclined to measure the sanitary requirements of municipalities by the population alone on the principle of the rule-of-three. He maintained that all tenement houses should be inspected several times a year, also schools and similar establishments. It was a great defect that sum-

monses for sanitary offences were heard by the police magistrates who had no special knowledge —a procedure which led to much delay. He would have a court in all large towns for the hearing of such cases, as well as summonses under the Adulteration Acts, the magistrate in which would soon become an expert in these matters. The building Acts called for amendment; he himself hesitated to condemn many two-story dwellings lest they should be succeeded by huge blocks deficient in air and light. Such, as well as the suburban jerry-built houses, which were dilapidated in three or four years, constituted a great danger to the public health in the near future.

After some remarks by Mr. Mark Judge, Mrs. Sheldon Amos, and Mr. Hugh Alexander, Dr. E. Gould replied, and gave an account of the sanitary administration in New York State. There the powers conferred on the municipal boards of health were proportioned to the respective populations of the towns, and the inspectors were partly experts and partly police officials. The erection of every house, of whatever class, was supervised by the technical officials of the Board at every stage, and all plans and specifications open to public inspection at the office. The water supply could not be connected until the plumbing was certified as perfectly satisfactory, and all houses were subsequently inspected from two to six times a year.

Physical limits to the extension of the city necessitated lofty blocks, but the strictest provision was made to ensure adequate ventilation and light.

Alkali Works.

Mr. Fletcher read a paper on the progress of legislation in respect of emanations from alkali and chemical works, in which he pointed out the inapplicability of the common law of the land in consequence of the difficulty of assessing the damage or fixing the responsibility on any particular factory and the consequent need for preventive enactments.

Adulteration.

Dr. Von. Hamel Roos urged the necessity of some international agreement as to what constituted adulteration, an article which was permitted to be sold in one country being liable to seizure when exposed in another.

Sale of Poisons.

Dr. Danford Thomas treated of the sale of poisons, whether as such or in the concealed form of proprietary medicines, and gave a sketch of the law on the subject in the chief countries of Europe. He observed that the records of the coroners' courts took no cogniznance of non-fatal cases of poisining, and that numerous poisons, some of which were favorite means of suicide as carbolic acid, were freely sold by oilmen, etc., or like cyanide of potassium, could be had without any precautions of wholesale dealers. He suggested that all proprietary medicines should be really patented, when their nature and composition would be known to all.

Thursday, August 13th.

Cremation.

A very crowded meeting assembled to hear the discussion on the best methods of the disposal of the dead. The leading papers on either side were read respectively by Sir Henry Thompson, and Mr. Seymour Haden. Sir Henry Thompson advocated especially cremation, and Mr. Seymour Haden his well-known method of perishable coffins. The discussion was maintained by many able speakers, and was throughout lively and well sustained. It ended, however, by the passing, by a very large and crowded audience, of a resolution proposed by Sir Henry Thompson, and seconded by Mr. Ernest Hart, "That the cremation of the dead is a rational and hygienic process, and one which is especially called for where death occurs from contagious diseases." This was carried with only four dissentients.

Education of Architects, Sanitary Inspectors, Etc.

Mr. Howard Seth Smith advocated the examination and registration of all architects in opposition to those who took what might be called the "fine arts" view of the provision.

Mr. Cates, F.R.I.B.A., defended the system of voluntary examination adopted by the Association of British Architects. Mr. Mark Judge was in favor of statutory examination of all candidates for appointments as district surveyers, and a resolution to that effect was carried almost unanimously.

The necessity for the examination and registration of plumbers was urged by the Master of the Company, by Mr. Anderson (President of the Association of Operative Plumbers), by Dr. Hill of Birmingham · Mr. Mark Judge and others.

Dr. Hill, Professors Hay and Garnett, Mason, Anderson, Buchan and others testified to the rapidly increasing favor of these diplomas throughout the trade.

Dr. Reid read a paper on the education, training and status of sanitary inspectors, whose functions he compared with those of the police. Mr. Hugh Alexander, President of the Association of Sanitary Inspectors, gave an account of the origin and progress of this body of officials.

The recommendations contained in these papers were embodied in a comprehensive resolution moved by the readers and carried with a single dissentient. Mr. H. N. Mozley, M.A., Camb., Barrister-at-law representing the "Personal Rights Association" on behalf of which he opposed every resolution proposed in this section.

Friday, August 14th.

Notification of Infectious Diseases.

Dr. Boobbyer read a paper on compulsory notification of infectious diseases. The single system adopted in very few towns was a complete failure, tempting concealment or neglect of medical advice. The dual system, in which practically the medical attendant certified the nature of the disease and relieved the householder of the trouble was the most successful. The results of prompt notification were seen in the immediate suppression of small-pox at Leicester, and the consequences of its absence in the epidemic at Sheffield.

Mr. Murphy, Dr. Hewitt (Minnesota), Dr. Covernton (Toronto), Dr. Sergeant and others joined in the discussion.

Mr. Biddle read a paper to which were appended tables of statistics intending to demonstrate the failure of notification, which he also denounced, on ethical grounds, as transforming the confidential medical friends into a common informer.

Dr. Cameron Spottiswoode maintained that though Mr. Biddle's facts were accurate as far as they represented the total zymotic mortalities reported by the Registrar-General, they were misleading, since they did not distinguish between notified and non-notified diseases of the zymotic class, nor between the periods during which the power of notifying had and had not been exercised. Measles, for example, swelled the zymotic mortality, but had only very recently been notified in one or two towns.

It having been insinuated that the fee was an inducement to reckless notification Dr. Simon, Breslau, Dr. Covernton, Toronto, and Dr. Ewing, New York, stated that neither in Germany, Canada, nor the United States was any payment made for notification.

The discussion having been continued by a number of speakers on each side, Dr. Martin, Paris, and others proposed resolutions that compulsory notification of infectious diseases was desirable and that it was best effected by the dual system. Both were carried by overwhelming majorities.

Contagious Diseases Acts.

Dr. Birkbeck Nevins read two papers on this question, which were discussed by Mr. Holroyde (Chatham), Mrs. Butler, Surgeon Major Pringle, and a number of other speakers, the general feeling being that apart from the question of morality, social inequalities and difficulties of diagnosis rendered the Acts practically inoperative.

Other Papers.

Papers were also read by Dr. Newsholme, on the Teaching of the Laws of Health in Schools; by Miss Margaret E. Scott, on Woman's Work in promoting the cause of hygiene; by Professor Corradi, on the Means for Checking the Prevalence of Phthisis, and by Dr. Villanova, on Sanitary Progress in Spain.

Congress Hospitalities

The British reputation for hospitality was well maintained during the week.

The corporation of the city of London entertained the members of the Congress at a conversazione at the Guildhall. The whole of the fine and ancient building was decorated picturesquely and filled with objects of art, among which the most interesting was the magnificent display of old plate of the city companies. A very largely attended conversazione was also given at the Hunterian Museum of the Royal College of Surgeons. Baroness and Mr. Burdett-Coutts gave a garden party at Holly Lodge, Highgate, which was very largely attended. There were also many other interesting amusements of a private and public character.

A handbook to London was presented to all the members of the Congress, the English and French versions appearing side by side on the same page. The information supplied was of a very practical character, and the maps were of great assistance to those unfamiliar with London.

Throughout the week the Medical Officers of Health Society published a special daily number of "Public Health," which gave excellent reports of the meetings, discussions, social gatherings and excursions. It was edited by Mr. Winter Blyth and was an exceedingly creditable and valuable production affording every day a review of the proceedings.

On Monday, August 17th, the proceedings of the Congress were formally brought to a close, by a general meeting held under the presidency of Sir Douglas Galton, in the theatre of the University of London. It was announced that the next meeting would take place in Budapesth in 1894. The total number of delegates, who attended the Congress was just over 2,700.

All of which is respectfully submitted,

J. J. Cassidy.

QUARTERLY REPORT OF THE SECRETARY *RE* WATER SUPPLIES AND DIPHTHERIA.

November 19th, 1891.

To the Chairman and Members of the Provincial Board of Health :

Gentlemen,—In the following report I desire to bring to your attention some of the more important matters which have required special attention during the past quarter.

I am pleased to be able to inform you that there is a prospect that the pollution of the Thames at London, Ontario, which some years ago required action on the part of this Board, will shortly be remedied by the construction of a trunk sewer, the disposal of the sewage on a sewage farm some distance below the city, and by the extension of the general sewerage system of the city, with an intercepting sewer by which the several sewers now polluting the river will be conducted to the main trunk sewer.

The sewerage works at Brantford and Berlin, both being constructed on the separate system, are being rapidly pushed forward and will when completed, be evidence of the advanced views which Ontario municipalities are displaying with regard to the disposal of sewage ; as in both cases the sewage will be disposed of on sewage farms, where the sewage will be filtered.

The town of Barrie has also during the past year constructed several miles of separate sewers, and the system is being gradually extended along the lines of a comprehensive plan, by either petitions or on the recommendation of the Local Board of Health on sanitary grounds.

The city of Guelph is about to introduce a by-law for the construction of a sewerage system, and plans are likely to be submitted to this Board for approval before many months.

The towns of Windsor and Walkerville have not yet come to an amicable arrangement with regard to conjoint action in the matter of sewerage and water supply reported on at the second quarterly meeting this year. The matter may be said to have made some progress as Windsor is protecting itself against an injunction by Sandwich since it has arranged to supply Sandwich with water at a low rate. As Windsor and Walkerville boundaries touch, it is manifest that a similar agreement with regard to a water supply is desirable, while it would remove the difficulty now existing, owing to the main sewer of Walkerville polluting the Detroit river within three thousand feet above the Windsor intake pipe.

The town of Chatham has again been visited by me in order to inspect a new series of artesian wells some four miles distant which have been found to supply water at the rate of 300 gallons per minute in some cases from a single boring. The water according to various analyses has an excess of chlorides, but is in every way likely to prove a sanitary water of good quality.

The topography of the country will make the disposal of sewage in any other way than into the River Thames a practical difficulty ; but as there are no other towns below it on the river there seems to be no objection to this so long as the river water is not used for drinking purposes. Some difficulty has been raised by the town against a township drain entering the river near the waterworks intake-pipe, owing to this drain passing through a growing suburb, making it likely to be used as a sewer. Danger from this source will likely be averted by the town utilising artesian instead of river water for public purposes.

The Hyatt filters in use at St. Thomas have been several times inspected and samples of water have been examined in the laboratory to test the capacity of these filters for removing bacteria. While to a considerable extent satisfactory, there are various improvements demanded before the Board can feel itself free to recommend this class of filters to municipalities for adoption.

The town of Peterborough has taken some steps toward the introduction of a sewerage system, which the growing density of population in the main business portion is causing to be urgently required if the town is to keep abreast of the marked progress in municipal sanitation which is becoming the gauge of the desirability of a town as a place for attracting new business enterprises.

The town of West Toronto has advertised for tenders for the construction of certain portions of the sewerage system submitted to the Board for approval at its May meeting. An agreement is likely to be arrived at whereby the scheme approved of by this Board for draining in to the Toronto Garrison Creek sewer will be carried out.

The problem of the disposal of Toronto sewage by an intercepting trunk sewer is being worked out, and a scheme is likely to be soon laid before the council for consideration. Owing to the memorial addressed to this Board, to the Board of Trade, and the City Council by the Canadian Institute, the various memorialized bodies met in the early summer, and after considering the subject, laid out a plan of operations for the study of the lake currents in the bay and lake front. That portion of it undertaken by your Board has included an extended series of bacteriological examinations of the water taken at many points, and under varying conditions of temperature and currents. The various sub-committees of the works are now arranging their data, and a conjoint report of much interest may be expected for submission to the next quarterly meeting of this board.

Water Supplies.

The unusual character of the season during the past three months has brought into special prominence the qualities of the water supply in all portions of the Province, and has enabled more or less careful observation to be made upon its relations to typhoid prevalence. It has long been believed and known that well water at this season of the year, where polluted is very liable to produce the disease, and it has generally been believed that public supplies from a sewage polluted lake or river would produce the same. While the regular staff of the office of the Board is insufficient to carry on extensive detailed investigations on these points, several facts have occurred to lend proof to the old belief. For instance in Barrie where a more than usual number of cases for that town have occurred, they are almost all on premises still supplied with well water, and curiously, almost all in a section of the town thinly populated, but where the wells were shallow and in a very porous bed of sand.

In all cases these wells were near the kitchen door, and generally within fifty feet of the privy. Where the town water is taken I believe but two cases had occurred

Again, I am informed by the Medical Health Officer of Brantford, that although every house is not yet supplied with the public water, yet the more general use of city water and the steady abolition of privy-pits has caused the number of cases to be scarcely more than 50 per cent. of that last year, although this season has been more than usually favorable, owing to its high temperature, to the prevalence of typhoid.

The Massachusetts Annual Report just received give some remarkable confirmatory evidence of these points. It states :

" The highest death-rates by typhoid fever in the State are not in the cities, but are in the towns that depend for water upon wells. The five towns highest on the list for the past 18 years have an average death-rate of 12.82 per year for each 10,000 inhabitants; while the five cities having the highest death-rate by typhoid fever, in the past 12 years average 7.65 per 10,000, and the average for all of the cities of that State, in the same time has been 4 62."

The two cities of Lowell and Lawrence having for several years shown an unusually high death-rate. the State Board made a detailed study of them and found remarkably conclusive evidence of the river water supply being the direct cause of the epidemics in these two cities, the cases being generally distributed within the area supplied by public water. It was found that Stony Brook, three miles above the intake-pipe of the Lowell waterworks had been polluted with fæces of typhoid patients ; that a very few weeks after this there was a very rapid increase in deaths from typhoid in Lowell ; and that these were in about six weeks followed by an alarming increase of typhoid deaths in Lawrence whose water supply is drawn from the Merrimac river nine miles down stream from where Lowell sewage enters the river, and typhoid germs were found in December in the water pipes of Lawrence.

The polluted water of Lowell could reach the Lawrence reservoir in eight hours, and direct experiment with water taken from the Lawrence waterpipes and kept by ice at a temperature as near freezing as possible, was found to maintain typhoid germs alive for at least twenty days.

With greater warmth and new nutriment it is apparent that there can be no absolute immunity through dilution, or low temperature wherever typhoid germs enter rivers or lakes. Prevalence of typhoid in Chicago this autumn may be considered a proof of the latter, and one per cent. of Toronto sewage water from the bay constantly entering the pipe causes one to wonder how long the simple expedient of putting the pumping station on the Island to prevent the ingress by suction of bay water is to be delayed.

Very notable progress has been made during the season in introducing public water to our smaller towns.

Galt has almost completed works giving what is likely to prove a first class supply.

Amherstburg is now pumping from the Detroit river, but with the example of Lowell and Lawrence nine miles apart, we can but watch with interest the progress of pollution of the Detroit river with the sewage of Detroit, Windsor and Walkerville, to see whether its volume will be sufficient to prevent danger to Amherstburg.

Essex Centre is progressing with its works from an artesian supply.

Georgetown is introducing an unusually pure spring creek supply: while Arnprior waters are at present under examination as to their suitability for a public supply.

I have received information by public advertisement that Parry Sound and North Bay are both to shortly vote on a by-law for public water. No plans or specifications have been forwarded to the office of the Board, but I have learned that strong opposition is expressed to the proposed point of supply at Parry Sound, as the pipe is to pass but a few hundred feet from the shore and at a point where the waters of the Seguin river laden with refuse from logs and saw-mills are swept in a current along the shore. As any by-laws passed under the circumstances will be illegal, it will be for the Board to take action in the matter.

All the facts referred to, as also my observations in various places in the Province point out the desirability of the Board urging everywhere, not only the construction of public waterworks and of its exercising the closest supervision over the proposed sources of supply, but also of drawing the attention of Local Boards to the most prevalent cause of typhoid, viz.: in well waters, and of urging upon them the duty of closing wells wherever public water supplies exist.

Diphtheria.

The appearance in epidemic form of diphtheria in Toronto, Guelph, French River, and various other places during the past season again makes it necessary to advert to its causes and method of spread. Doubtless organic matter in cellars, under foundations, in yards, privies, street excavations, block-pavements, etc., plays an important part; but everywhere the fact exists that by far the greater number of cases are due to direct infection from existing cases.

While in large houses with intelligent, trained nursing, isolation of patients is readily possible, it may be said that in small houses, with simply what help the mother can give, isolation is almost impossible. In the latter the disease spreads from child to child, not seldom to the nurse and those members forced to go to work aid in disseminating the disease, while children even though spared from taking it, do in many instances bear the infection directly to crowded school rooms, as these houses are seldom if ever properly disinfected.

I have in every instance as opportunity offered, urged isolation hospitals to which a child with its mother, if wished, can be taken to be attended by the family physician. This method has been in use in Guelph for several years, where in 1889, 62 per cent. of all cases were treated in hospital with a mortality of only 8.1 per cent.

Last summer for several weeks the two city hospitals of Guelph became crowded, and at my suggestion a large tent for convalescents was pitched on the lawn as I found that mild cases were returning home within ten days of the onset of the disease.

Barrie has just purchased a building for such hospital purposes, in which to place diphtheria which has appeared there also; and at French River I instituted there an isolation house for the reception of diphtheria.

I would recommend that the Board reconsider the Diphtheria Regulations adopted and published in 1886, and publish them in special form as an order of the Board to be followed in such cases.

The prevalence of this disease makes reference necessary to the demand for some systematic method of dealing with corpses dead of the disease.

I have at different times reported to the Board instances where cases of so-called croup, inflammation of the lungs, etc., have been proven to be diphtheria by outbreaks occurring at parts where the funerals have gone; but there exists a primary difficulty in dealing with these, owing to the fact that the law does not specifically direct that all cases of death be reported before burial to the Medical Health Officer. Until this is done the spread of disease in this manner by train will not be prevented

What is necessary is that Local Boards be by law in the position to examine before burial every death certificate, and that wherever any such certificate may cause the Medical Health Officer to find or suspect serious contagious disease, he may institute an investigation and take such steps *re* disinfection and private burial as will prevent outbreaks from such source.

All of which is respectfully submitted.

P. H. Bryce,
Secretary.

SECRETARY'S QUARTERLY REPORT *RE* ANIMAL DISEASES.

TORONTO, Nov. 19th, 1891.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—The quarter's work has included, in addition to the many examinations of water for proposed town supplies and of well waters suspected of being the cause of contagious disease, the examination into outbreaks of disease which have occurred in animals in different parts of the Province. Reference was made at the last quarterly meeting to the serious outbreak of anthrax at Acton. It is pleasing to be able to state that no further cases have occurred there, and that the proprietors of the large tanneries have complied with the suggestions of your secretary and carried out the plans for filter-beds for filtering the effluent water from the tannery before its entrance into the creek. I regret to have learned, only by the merest accident, that some seven animals have died during the past summer on the flats below Guelph which became seeded with anthrax several years ago. It indicates not more the persistency of the germs of this malignant disease, than the necessity there is for the adoption of scientific methods for the disposal of sewage. Cattle have during the four past years been lost on these Guelph flats, aggregating a value of several thousand dollars, while the loss of pasturage has been of a serious character. It is to be hoped that the Guelph system of sewerage about to be initiated will soon remove this loss.

The other most serious cattle disease which has called for action on the part of the Board is actinomycosis. Specimens of suspected tissues have been forwarded from various districts, and in almost every instance biological examination has proved the disease to have been present. In one week six cattle were discovered in the Toronto cattle market suffering from this disease, and owing to a preliminary doubt as to the power of the Local Board of Health to deal with animals consigned for through shipment, which doubt has, however, been effectually removed by the decision of Police Magistrate Denison, I deemed it proper to take action as a provincial officer, and had four animals seized, two of which were destroyed in Montreal and one in Toronto. Bacteriological examination proved the nature of these cases. Other specimens have been received from Waterloo county, and from Lone Island Park, Man., and have been proved to be the same disease; while I have had information of the disease being in existence in various points in Western Canada, and one case even as far north as Parry Sound, and several places in Eastern Ontario. That the disease has increased in recent years is beyond question, and that its germs are capable of dissemination is not only proved from the occurrence of several cases in the same farmyard succeeding one another, but from the interesting fact that my assistant in the laboratory, Mr. J. J. Mackenzie, has succeeded, probably for the first time on this continent, in actually cultivating the microbe on agar-agar. It is to be hoped that these facts may not only be widely published throughout the Province, but also that the law as regards these and other scheduled diseases of animals may be made widely known.

There have been no specimens of tuberculous meat or udders sent for investigation, but this rather indicates the imperfect nature of the inspection of slaughter-houses and dairy-cows, than the absence of the disease. One serious outbreak in a herd of Jerseys was reported in the eastern part of the Province, while here and there I have learned of animals with diseased lungs having been put up for sale. Investigation in a systematic manner in the western stock-yards has revealed the fact that at least three per cent. of animals fed on the open prairies are tuberculous, and when this is true, and when exact examination reveals that from five to ten per cent. in different districts in Germany are tuberculous, we cannot doubt that in a country with as much stall-feeding as in this Province, the disease must be more or less prevalent. When it has been absolutely proven that milk from tuberculous udders contains numerous bacilli, and that even muscular tissue from tuberculous animals, though showing no tuberculous bacilli, when fed to guinea-pigs has produced the disease, it is high time that everywhere, but notably in our cities, the strictest inspection of dairy and slaughter cattle should be instituted. Professor McFadyean at the recent meeting of the Sanitary Association of Scotland, at Edinburgh, stated that probably twenty per cent. of the dairy cattle there at the present moment are affected with tuberculosis.

But more prevalent, though probably of less immediate danger as a human food, have been localised epidemics of hog-cholera. About the middle of August it became known to the health department of Toronto that some disease was rapidly carrying off hogs in several hog-feeding establishments about the city. After discussing the matter with me, Dr. Allan, the medical health officer, instituted a close inspection of several of the large hog-yards and found that it was the practice so soon as an animal seemed unwell to slaughter it and send the meat to market. As the disease is one for which compensation is given under the Animal Contagious Diseases Act, Canada Statutes, Cap. 68, 1886, I further suggested to Dr. Allan, in order that his work might be more effectual, as also that the owners of any animals condemned to be slaughtered might get

compensation, that he call in the services of Prof. Andrew Smith, V.S., the District Inspector under the above Act. Prof. Smith made an investigation of a number of pens, and I am given to understand could not state positively that the disease was hog-cholera. He suggested that it might be intestinal trouble, due to feeding hotel slops and offal in hot weather. Still the animals kept on dying, but only in pens where connection more or less evident with some previously sick hogs had been possible. East, north and west of the city outbreaks have, according to the best information, occurred. Other outbreaks amongst hogs have appeared in Simcoe County at Victoria Harbor, in Brant County at Burford, and in Frontenac County at Kingston Penitentiary and the Lunatic Asylum. I have understood that in no single case of these have the Inspectors under the Contagious Disease Act declared the disease hog-cholera. What was intestinal irritation in August is now called enteric (or typhoid) fever in November. Still the hogs keep on dying by scores in the same herds, even where they are fed on the best of grain food, and miles distant from the cities; but neither in the Toronto hogs, in the Victoria Harbor hogs, the Burford hogs, nor in the Asylum hogs, are we told that hog-cholera is present.

I have endeavored to obtain the clinical facts, and have got them from medical men who have seen Victoria Harbor hogs, Toronto hogs, Kingston hogs, and the prominent symptoms which mark hog-cholera, as described by the Veterinary Department of the Bureau of Animal Industry at Washington, have been present in every case.

But clinical symptoms may, in individual cases, be deceptive, though not probable to occur where the disease is in a whole herd. So I shall apply the most accurate test modern science knows, namely, the cultivation of the disease germ from the tissues of diseased animals. The work done on hog-cholera by Professor Salmon, of the Washington Bureau, and his assistants, is now classical, and the field has been recently worked over again by Professor Welch, of Johns Hopkins University, and the biological facts and the identity of the hog-cholera bacillus of Professor Salmon have been confirmed, and indeed are now everywhere accepted. In the recent outbreak in Ontario, cultures of tissues from blood, spleen, liver and lungs have been made, both in the Laboratory of the Board, and in that of the University Biological Department, from Toronto cases, Burford cases, and Kingston Asylum cases. Cultures may be seen in the Laboratory of the Board, wherein the macroscopic and microscopic appearances are identical with those found by Professor Salmon and Professor Welch, and that it is the germ of hog-cholera has been proved in the United States by reproduction of the disease through inoculation of the bacillus.

Can further evidence be needed, or is any further required? If so, then in at least three district outbreaks during the year, and in quite different sections of the country, I have been able to trace the infection from one or more primary centres.

I have dealt with these outbreaks somewhat in detail for two reasons, first, because the Public Health Act of Ontario requires all Medical Health Officers and Sanitary Inspectors to seize all unsound meat, and amongst others, animals suffering from hog-cholera; and it is manifest that if this Board does not hold a definite opinion regarding the nature of this disease amongst hogs, confessed by all, I believe, to be contagious, and is not prepared to maintain its opinions by biological evidences, then it has simply paralyzed prompt and effectual action on the part of 600 Local Boards of Health who may have to deal with the disease; and second, because by this Board being attached to the Department of Agriculture your Secretary has placed upon him, by Amendments to Sec. 99 of the Public Health Act, the investigation of Contagious Diseases in Animals.

It is not for this Board to discuss economic problems, but naturally the Minister of the Department takes a foremost interest in the maintenance of the high character of Ontario stock as regards the health thereof, and after having patiently beheld during the two past years the establishment every few months, in some new centre, of a disease which has proved its ability not only to exist, but even to spread rapidly in the severe weather of a Canadian winter, and which for a number of years past has been the direct cause of millions of dollars of annual loss to the farmers of the Western States, if I should continue to maintain a silence regarding it, I would feel that I had neglected my duty both as a health officer and as an officer of the Department of Agriculture. Accustomed to dealing with outbreaks of small-pox, diphtheria, etc., health officers understand perfectly that prompt isolation and disinfection are the only remedies for stamping out epidemic diseases; and if in addition to the utilization of both these, advantage be taken of the fact that surveillance of presumably infected animals during the period of incubation, and the prompt removal and slaughter of any showing signs of the disease is readily possible, it would be found that apart from the danger of new importation of the disease from the west, hog-cholera as a disease would not, within a few months, exist in the Province of Ontario.

Respectfully submitted,

P. H. Bryce,
Secretary.

REPORT OF THE SECRETARY *RE* THE ACTON TANNERY.

To the Local Board of Health, Acton:

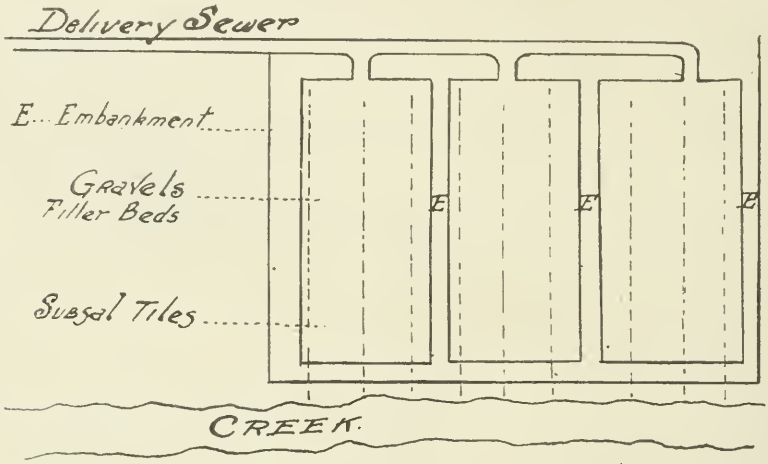
GENTLEMEN,—Having examined the tannery and the sources of the pollution of the creek running through the several farms below the village, I would as requested, make the following suggestions as being likely to greatly mitigate or remove the nuisance caused by pouring the waste water from the tannery into the creek.

1. For systematically dealing with the waste water, it is desirable that the volume of water to be treated be made as small as possible, by turning directly into the creek, the waters of the springs and all other waters which do become contaminated.

2. Convey as at present, the polluted water to the place where it is to be treated.

3. Have the area at present used for allowing the grosser materials in the polluted waters to settle, or as much more as may be found necessary, made into a series of flat beds, in a manner similar to that carried out in different places.

4. As to the extent of these required for performing the necessary work, it will depend on the volume of refuse water to be treated. But in the meantime I would suggest that the present area be first prepared for the reception of the sewage, by converting it into an oblong flat bed, divided into three sections as in the following diagram :



The sides should be raised at least 18 inches above the level of the flat-bed, and be made of planking with present earth, or if preferred, with good clay, so that they will be strong and impervious banks. The ground of each flat-bed should have a series of two-inch tile drains laid at a depth of 2½ feet below the level of the flat-bed, and fifteen feet apart. The ground which is gravelly, should during the levelling be all carefully ploughed and sub-soiled so as to be made as porous as possible. On the levelled surface one foot of pure sharp sand, (coarse) or fine gravel will then be hauled. It is of the greatest importance that this filtering material contains no clay.

5. The beds having been thus completed, they will be ready for the treatment of the sewage in the following manner : On flat-bed No. 1 turn the sewage of 24 hours from the conduit by several gates and small carriers, which will deliver the sewage so as to evenly cover the whole filter-bed. Treat beds No. 2 and No. 3 similarly on the second and third days, returning to No. 1 on the fourth day, and so continuing the rotation. By this means each bed will have an intermittent filtration, and time to cleanse itself before being used again. It will filter the water rapidly downward and run purified from the tile drains, if they are kept above the clay.

6. On the side of the filter-beds towards the hill a deep ditch must be dug so as to carry all rain and soakage from the hillside away from the field to the creek direct.

7. Should it be found that the waste water has a notable acid reaction in the conduit, it will increase the rapidity and thoroughness of the purification if the refuse water before flowing on to the filter-bed be carried into a tank where it can be treated with an amount of milk of lime sufficient to neutralize the acid. A partial sedimentation will take place in the tank from which the upper water can be allowed to flow to the filter-bed. A pair of tanks to be used alternately would be necessary in this case, since from time to time the sediment would have to be removed.

In the meantime, however, I think it will be found that if the filter-beds be carefully constructed, that they will be equal to the necessities of the case.

I forward you a copy of the Annual Report of this Board in which the sewage farm at London Asylum is reported upon in detail, as also papers bearing on this subject found in the report of the Health Officers' meeting at Owen Sound.

I have made these suggestions unofficially in order that the matter complained of by the owners of lands along the creek may be arranged amicably with the owners of the tannery.

Should there be a neglect on the part of the latter to take prompt and early action, the regular steps to be taken for the abatement of the nuisance would have to be set in motion.

These are indicated in sections 64, 29, etc., of the Public Health Act, Cap. 205.

Of course actions for damages under common law, or an application for an injunction may be taken, but I trust that in a case where the remedy can be so readily applied as in this, the suggestions I have made will prove to be sufficient.

I have the honor to be,
Yours truly,
PETER H. BRYCE,
Secretary.

OFFICE OF PROVINCIAL BOARD OF HEALTH,

J. MURRAY, ESQ., TORONTO, Sept. 5th, 1891.
Sec. Local Board of Health,
Esquesing.

DEAR SIR,—Your communication of Sept. 4th has been received. In reply I take pleasure in forwarding to you a brief statement of the results of the laboratory investigation of specimens sent.

LABORATORY REPORT *re* SPECIMENS OF TISSUE FROM ACTON.

July 22nd. Flynn's first cow; undoubtedly anthrax both from microscopic examination of blood and from cultures of the microbe.

July 24th. Flynn's second cow; undoubtedly anthrax from the same evidence as first.

July 27th. Flynn's third cow; material in very bad state of putrefaction. Microscope however, showed bacilli, as also cultures.

July 29th. McPherson's horse; putrefaction advanced in specimen. Blood filled with anthrax spores. Bacilli had disappeared from blood. Plate cultures gave one or two colonies of the anthrax bacillus.

You will see that all the animals died from the same disease, and the fact that all these animals had fed on the flats along the creek below Acton, or in fields where infected animals had been buried shows that some common cause has been present. From the history of such outbreaks in Acton, as well as in other countries, there is little doubt as to the origin of the disease.

It is extremely probable that at some time, it may have been several years ago, but probably during the present year also, the germs of anthrax have been borne to the flats and deposited there or along the banks of the stream. It is probable that on some particular days germs of anthrax were actually present in the creek-water when drunk by animals.

In both cases the germs have been introduced into the system of the animal, and multiplying rapidly, have caused the disease so commonly fatal.

How dangerous it is may be judged from the fate of the pigs to which milk from a sick cow was given on the farm of Mr. Flynn, sr.

As to the probability of its recurrence, it may be said that the history of the disease is, that ground infected with it is dangerous to cattle feeding thereon for several years after infection. This is especially true of these grounds, when they are eaten off close to the ground in dry seasons.

It hence is apparent that under any circumstances the flats infected should not be used for pasturage for several years except at times when the grass is long. It would be a proper thing for your Board to issue a positive order, preventing any milch cows from feeding on the flats during certain periods, according to the character of the season.

If owners chose to pasture horses or young cattle they might take the risk; but they must know that no animal could be sold therefrom until it has been proved by a fortnight's stay in another field, to be perfectly healthy.

By section 99 of the Health Act your Board must punish with severest penalties anyone who sells the flesh, milk or hides of any animal dying of the disease.

These are the main points for your Board to consider and I trust that the Board will see that they are carried promptly into effect.

With regard to the prevention of the pollution of the stream from factory, tannery, or other refuse I have advised the Acton Board of Health and the owners of the tannery on the stream above. If the work carried out is not satisfactory to your Board, as also to that of Acton, it will be proper to apprise me of the fact.

I have the honor to be,

Your obedient servant,

PETER H. BRYCE,
Secretary.

REPORT OF THE SECRETARY *RE* STREETSVILLE CEMETERY.

TORONTO, February 4th, 1891.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—I have the honor to report that in accordance with the Public Health Act, I visited on February 3rd, 1891, the village of Streetsville for the purpose of inspecting the site of a proposed new cemetery for the village.

I found it situated on the brow of the north bank of the River Credit about half a mile from the village, which contains 800 inhabitants, and is situated on the south side of the river rather higher up than the proposed site. The site is a beautiful one, and easy of access by a bridge from the village, and is over 200 yards from the nearest house. The soil is largely composed of sand and gravel and will fulfil very well the purposes for which it is intended.

The only sanitary question which can arise in connection with the site is the possible danger which might arise from drainage into the river from it.

It would seem that no practical objection can be made on this ground as the stream is not likely to ever come into use as a public water supply for the village, it having equally convenient to it a spring creek (Mullet Creek) as well as springs along the river bank.

Below are several mill-dams, two near the village and one at Springfield, a small place four miles further down.

All of which is respectfully submitted,

PETER H. BRYCE,
Secretary.

REPORT OF NEUSTADT TANNERY.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—On August 12th, I visited Neustadt to investigate, on complaint of Dr. Niemeier, the tannery and the stream running through the village. Dr. McLean, Medical Health Officer for the Township of Normanby, met me at the station and took me over the village.

The stream in question is about 2 or 3 inches deep and 4 or 5 feet wide and enters the village on the south side, pursuing a course almost directly north and south through it passing out at the north side, being used there to supply water for a boiler of a steam saw-mill.

Just before entering the village it passes under a butter factory and the cans containing cream are washed into it. It then turns a short distance to the west and passes into the barn-yard going beneath it in a covered drain and coming out again at the north side of the yard.

The tannery uses entirely green Canadian hides which are first soaked in running water and then passed through the various baths used in the tannery process.

All the drainage from the tannery passes into the stream, which consists usually of the running water mentioned above, but may also include the contents of the spent vats. The scrapings of the hides are all burnt, but undoubtedly some of them must enter the stream.

Sixty feet north of the tannery and in the tannery-yard, is a privy under one side of which the stream runs. Adjoining this privy, to the west, is a stable and manure heap which is also close to the stream. Passing out of the tannery-yard the stream runs north-west and west

across a field, then crosses the road, turns north again and passing through the village, as shown on the map, is joined by another stream of the same size which comes from the south-west.

At the north of the village there is a saw-mill, and the water of the stream is slightly dammed in order to give sufficient depth for pumping water to the boiler.

The wells of the village are situate with one exception, quite a distance from the stream, (over fifty yards.) The one which is nearer than fifty yards is shown on the map near the Gottfred's house. It is about 20 feet from the stream and is 15 or 16 feet deep.

At the time of my visit there was no perceptible odor from the stream in the village, but it undoubtedly must be bad sometimes from the fact of the vats being emptied into it.

The only cases of sickness which I could get any account of were as follows :

At the post-office, shown on the accompanying diagram, there had been a case of what the attending physician, Dr. Brown, called inflammatory croup ; he had used carbolic acid very freely as a disinfectant.

Shortly afterwards Mrs. Rudolph (patient of Dr. Niemeier), took diphtheria. Her house is shown across the street from the post-office. The only other case of diphtheria of which I could find any trace was Dr. Niemeier's grandson, who came to Neustadt on a visit and contracted the disease shortly after reaching there, but some time after the other two cases.

There had been two cases of typhoid fever in a house close to the stream and near the small dam mentioned above. The first case was a visitor in the house, who developed the disease thirteen days after her arrival there. The second case appeared eight weeks later. Dr. Brown, the attending physician, told me that he had ordered them to boil all their drinking water and to use disinfectants.

They had no well on the premises, but had to carry their water over seventy yards.

The butter factory has been in the place over two years and the tannery about twenty-five years.

It does not seem to me possible to trace the cases of diphtheria and typhoid either to the butter factory or the tannery, but in hot weather and when the vats of the latter are being turned into the stream, it must constitute a very considerable nuisance, and must always threaten danger to the village.

Especially I would call your attention to the privy in the tannery-yard, situated right over the stream, and the manure heap adjoining it.

I submit also two maps of the village and tannery-yard.

I have the honor to be,
Your obedient servant,

JOHN J. MACKENZIE.

REPORT TO THE SECRETARY *RE* THE ONTARIO VACCINE FARM AND THE DRAINAGE OF PALMERSTON.

SIR,—At your request, whilst inquiring into the tannery nuisance at Neustadt, I called upon Dr. Stewart of the Ontario Vaccine Farm at Palmerston.

Dr. Stewart's establishment is in Palmerston, a portion of his own barn and stable being set apart for vaccine production. A map of same is appended to this report.

The calves which he uses are procurred from the neighboring farmers for a small fee, no difficulty whatever being found in securing a sufficient number.

For the ordinary needs of the establishment one calf every three weeks is found quite sufficient.

Care is taken that the animals selected are in good condition and they are seldom over eight months old.

The animal is vaccinated on the inner side of the thigh and the pustules take about five days to develop.

When developed the pustules are broken and the points simply dipped into the lymph one by one, only those pustules being used from which there is a free flow of lymph. If a pustule shows a tendency to bleed it is left and no more lymph taken from it until the blood coagulates, which it soon does.

An animal may be used for two or three days as the pustules do not mature simultaneously over the whole surface, but by taking points only from those which are fresh and freely flowing the presence of putrefactive or septic germs is avoided. On an average a thousand points are obtained from each animal.

The points are placed in rows in a holder and allowed to dry in the operating-room or in the house, and as soon as dry are dipped in clear egg albumen, thus being covered with a layer which apparently protects them.

This addition of an albumen film Dr. Stewart has used for some time and finds it works admirably.

After drying, the points are placed in a refrigerator and kept there until shipped. The premises are clean but form part of the ordinary stable, one stall being reserved for the calves undergoing treatment. The operating-room is a small addition to one side of the stable separated from it by a door and having a window looking out on a garden.

The floor of the barn and stable are somewhat low, but Dr. Stewart purposes shortly putting in a new floor and raising it somewhat.

Whilst in Palmerston I was requested also to look into the subject of the town drainage.

The town possesses an ordinary wooden drain passing through the principal streets and into which the cellar drains from houses empty, none of them being trapped.

The drain from a woollen-mill also empties into this wooden structure, discharging into it about 150 barrels a day.

The wool used is Canadian unscoured wool and imported material ready scoured, from the Cape, Australia and East Indies.

The Canadian wool is not scoured thoroughly until made up into blankets, when it is treated with hot water and soap and then rinsed.

Dyed goods are dyed with logwood or aniline dyes, two of the latter, a red and a blue being used. The other chemicals used are bichromate of potash, copperas and sulphuric acid, all of which leave the mill by the drain in question and pass into the town drain.

The town drain opens upon the north side of the town upon a flat swampy tract of land where it is to a great extent dammed back by the railroad track.

The owner of this pasture states that one of his cows died last spring very suddenly and he attributes it to the animal drinking the water from the drain. He was unable, however, to describe the symptoms very accurately. Last spring also the drain became obstructed at one part of its course in consequence of which the cellars of all the houses above the point of obstruction were flooded with drainage from the woollen mill. There seems no doubt whatever that something ought to be done to remedy this evil, but the authorities are in trouble as to who is to blame, the council claiming that the owner of the woollen-mill which is the immediate cause is responsible, whilst the latter claims that as he received permission to use the town drain from the council, his responsibility ceases as soon as his drainage passes into it.

With the exception of the cow mentioned above I was unable to find any traces of disease resulting from this state of affairs, but all the conditions are extremely favorable for the propagation of disease if it once broke out and steps should be taken to prevent it.

I have the honor to be, Sir,
Your obedient servant,

JOHN J. MACKENZIE,
Analyst, Provincial Board of Health.

REPORT TO THE SECRETARY *RE* SANITATION IN LISTOWEL.

SIR,—August 13th, on receipt of your telegram, I drove from Palmerston to Listowel to look into the state of sanitary matters in that town.

It was, unfortunately, a holiday when I went there, and the mayor who is chairman of the Local Board was out of town. I called on Dr. Nichol, the Health Officer, but could learn very little about the Board except that it had not met since his appointment at the beginning of the year.

I was unable to discover the name of secretary or of any of the other members.

Listowel has a waterworks system for fire purposes, the water being drawn from a small stream which passes through the town.

The same company which supplies the water for fire purposes are now putting in pipes for supplying some of the houses and the hotels with drinking water, the supply being taken from a well which has been in use for some time. The depth of the well is about fifteen feet and the water stands in it usually at five feet.

There is no regular system of drainage. The hotels have water-closets and drain into the river.

Just above the town there is a woollen-mill which I believe uses the same processes as the one in Palmerston and drains directly into the river.

I could hear of no special outbreaks of disease; the two medical men on whom I called both said there had not been more than the usual amount of diphtheria and typhoid during the year.

I have the honor to be, Sir,
Your obedient servant,

JOHN J. MACKENZIE,
Analyst, Provincial Board of Health.

CORRESPONDENCE *RE* DETROIT RIVER QUARANTINE INSPECTION.

The following correspondence relates to the outbreak of small pox in the autumn of 1891, referring especially to the action instituted by the Marine Hospital Service in the inspection of passengers entering the United States by way of Port Huron and Detroit.

CORRESPONDENCE *re* QUARANTINE INSPECTION AT SARNIA AND DETROIT.

LANSING, MICH., November 12th, 1892.

Dr. P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

Small-pox. Infected car side-tracked at Point Edward. Respectfully suggest disinfection.
(*Telegram*). HENRY B. BAKER.

LANSING, MICH., November 12th, 1892.

Dr. P. H. BRYCE,
Secretary Provincial Board,
Toronto.

Two cases small-pox at Port Huron. This morning returned into Canada.
(*Telegram*). HENRY B. BAKER.

TORONTO, NOV. 13th, 1891.

DR. HENRY BAKER,
LANSING, MICH.

Medical Health Officer of long experience at Sarnia reports both cases to be measles. Precautionary quarantine instituted.
(*Telegram*). P. H. BRYCE.

LANSING, MICH., NOV. 16th, 1891.

DR. P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

In view of small-pox in five counties of Quebec, also ordinary dangerous diseases, and to emigration to Michigan and North-west, do you see any serious objection to inspection at Port Huron and Detroit.
(*Telegram*). HENRY B. BAKER.

The Secretary telegraphed to Dr. Baker from Port Elgin to the effect, that the cases of small-pox were mostly along the Baie de Chaleurs and no cases existed in Montreal; that he had the fullest confidence in the Quebec Provincial Board, and further inspection was undesirable, it being both unnecessary and injurious to commerce. Notwithstanding this telegram the Marine Hospital Service at Washington was requested to institute an inspection as seen from the following order.

TREASURY DEPARTMENT,
Office of the Supervising Surgeon-General,
Marine Hospital Service,
WASHINGTON, D.C., November 28th, 1891.

Doctor J. J. MULHERON,
U. S. Sanitary Inspector, M.H.S.,
Detroit, Michigan.

SIR,—You are hereby directed to inspect, at the port of Detroit, all immigrants and travellers bound for the United States and coming from the Counties of Bonaventure, Rimouski, Temiscouata, Gaspe, Sherbrooke, and Quebec in the Province of Quebec, or from any other place in that Province where small-pox is known to exist or may occur hereafter.

Persons suffering from small-pox or other dangerous contagious diseases will not be permitted to enter the United States.

Immigrants or travellers coming from the counties above mentioned, and who it is believed are likely to have been exposed to the contagion of small-pox, will not be permitted to enter the United States unless they can produce satisfactory evidence that they have had small-pox, or that they have been recently successfully vaccinated, or will permit of vaccination. You will vaccinate free of charge all unprotected persons coming from the Province of Quebec, where small-pox exists, or may hereafter occur.

The baggage of all persons coming from any infected district in the Province of Quebec, and believed to be infected, must be thoroughly disinfected before passing.

You will make weekly reports to this office of the work performed, which should include the number of persons excluded, number of persons vaccinated, number of pieces of baggage disinfected.

Respectfully yours,
(Signed) WALTER WYMAN.
Supervising Surgeon-General, M.H.S.

(Above was letter of instructions to the Inspector at Detroit.)

As a protest to the inspection thus instituted the following circular was sent out to the various State Boards of Health :—

TORONTO, November 25th, 1891.

To the President and Members of the State Board of Health of

GENTLEMEN,—On the morning of the 12th of November, 1891, a telegram was received by the Secretary of the Provincial Board of Health of Ontario from Dr. Henry B. Baker, Secretary of the State Board of Health of Michigan, stating that two cases of small-pox had been detected on a Grand Trunk Railroad car at Port Huron, and had been returned to the Canadian side in said car, where they were isolated by the Grand Trunk Railway authorities.

The Secretary of this Board immediately telegraphed Dr. T. Johnston, an experienced physician and health officer of Sarnia, to examine into the facts of the case. He received a prompt answer by telegraph to the effect that the cases had already been seen by Dr. Johnston, and were without doubt measles. A letter followed stating that the cases of measles were in German immigrants who had landed in New York. (A rash had appeared on one child two days before landing at New York. There they were quarantined six days and allowed to proceed on their journey. On the twelfth of November a rash appeared on the second child while passing through Ontario. They were on their way to Dakota).

The cost of taking care of these cases of disease has not only been thrown upon an Ontario municipality, but their existence has been made the occasion upon which the Secretary of the Michigan State Board of Health has appealed to the Marine Hospital Service for inspectors to inspect trains passing into the United States from Ontario along the St Clair and Detroit Rivers. As a signatory to the resolutions adopted in 1886 at the Toronto meeting of the International Conference of State Boards, this Board has agreed to notify all other State Boards of the existence of small-pox in Ontario.

It is hardly necessary to state that as no such notices have been sent to other State Boards they are thereby assured that no cases of small-pox exist in Ontario, nor have, indeed, existed for two years. But it may further be stated, that with the exception of a single family at Sherbrooke, and one case at Levis, in the Province of Quebec, some 700 miles from the Michigan border, no cases exist within 1,000 miles of the international boundary on the west.

Remembering the way in which the first person caused the outbreak in Quebec by travelling on the train, and thereby causing the appearance of the disease at six centres, and that within ten weeks of the appearance of first cases, only twelve cases exist out of eighty-eight, nearly all of which were first exposures, this Board desires to state that it has had no fear that the disease would spread to this Province ; first, because of the great distance away of the cases, and the fact that they are in a people who do not travel far from home ; and second, because of the vigilance of the Board of Health of the Province of Quebec. For these reasons this Board has not even deemed it necessary to inspect trains coming from Quebec into Ontario.

Now from these considerations this Board considers it apparent that the action taken by the State Board of Michigan which has led to the inspection instituted by the Marine Hospital Service is wholly uncalled for, and hence makes it necessary for this Board to request all State Boards, which view the facts stated as indicating satisfactory health conditions in Canada, to not only point out to the Chief Officer of the Marine Hospital Service that the intention of the arrangement entered into between State Boards of Health at the Toronto Conference of 1886 was to remove the necessity for such unnecessary and vexatious inspections, but also to urge in view of the facts, that any existing inspection be at once removed.

The unreasonableness of the inspection is further apparent when it is pointed out that during a period when in 1888, hundreds of cases of small-pox existed in Buffalo and vicinity, this Board deemed it necessary to have only one inspector stationed in Buffalo to keep it informed of the measures which were being taken by the health authorities there for stamping out the disease, and to keep Local Boards along the border on the alert for any cases that might pass over the river. But if anything were needed to enforce the argument it may be found in the fact that during the same year there were but fifty-four cases of small-pox, with three deaths, in Ontario, while in Michigan there were sixty cases and seventeen deaths, of which only three outbreaks are reported to have come from Canada (and all these grew out of the Buffalo epidemic); and yet Ontario did not dream of interrupting commerce and travel. To-day, with no cases in Ontario, for some unexplained reason we find an inspection instituted, with no results except to interrupt and injure the extensive commerce and railway interests between Ontario and the Western States.

If the comity which the establishment of the International Conference was intended to establish between the two countries, and between states and provinces, is to continue to exist, or to have any practical meaning, then this Board would appeal to all health authorities to express their views to the Chief Officer of the Marine Hospital Service in favor of a removal of an inspection as irritating as it is unnecessary.

P.S.—Formal protests by telegram, herewith subjoined, have been received from the managers of the two main Trunk Lines of Canadian Railways.

MONTREAL, 25th November, 1891.

P. H. BRYCE,
Secretary Provincial Board of Health.

Last Report of Provincial Board of Health for Quebec stated no new cases had developed. The Eastern States have adopted stringent inspection to prevent passage of suspected persons. Our medical officers are fully advised, and I have every reason to believe that such precautions are taken that no infected persons can reach the West, and that the action of the United States officers is quite unnecessary.

L. J. SEARGEANT.

OTTAWA, ONT., November 25th, 1891.

DR. P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

Press despatches from Washington indicate intention on the part of the United States authorities to put medical inspectors on Canadian trains at Windsor to guard against introduction of small-pox. This action is undoubtedly the result of erroneous information concerning prevalence of small-pox in Canada. I trust that you may by giving United States authorities correct information save our passengers from the annoyance of a disagreeable and unnecessary inspection. If I am correctly informed, small-pox has only been reported from the vicinity of the Gulf of St. Lawrence. An inspection against this at Windsor would be very like a Canadian inspection at Detroit against a disease prevailing on the Gulf of Mexico.

W. C. VAN HORNE.

(Signed) PETER H. BRYCE,
Secretary.

TREASURY DEPARTMENT,
Office of the Supervising Surgeon-General,
Marine Hospital Service,
WASHINGTON, D.C., November 30th, 1891.

PETER H. BRYCE, M.D.,
Secretary Provincial Board of Health of Ontario,
Toronto, Canada.

SIR,—I have the honor to acknowledge the receipt of your letter of the 26th instant, containing a printed circular issued by your Board, addressed to State Boards of Health, the purport of which is a protest against the establishment of inspection of trains passing into the United States from Canada at Detroit and Port Huron, and would respectfully state that the action taken by this Bureau has been based upon the reports received from the Provincial Board of Health of Quebec relative to an outbreak of small-pox along the Lower St. Lawrence River,

and upon requests for the inspection of trains crossing the river at Detroit and Port Huron, received from the Governor of Michigan, the State Boards of Health of Michigan, Minnesota, Wisconsin, and from the Commissioner of Health of the City of Chicago.

You will observe by the enclosed copy of instructions to our Inspector at Detroit, that the surveillance of passengers is only directed towards those coming from the counties in Quebec, where small-pox is known to exist, and not against Ontario, and that the interference with travel or commerce will be very slight, if any. I have also to inform you that an officer of this Service, P. A. Surgeon, Dr. S. C. Devan, will proceed to Montreal and confer with the Provincial Board of Health and make a full report to this Bureau.

The inspection service will be continued no longer than is considered necessary.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General, M.H.S.

MICHIGAN STATE ROARD OF HEALTH,
LANSING, MICH., November 28th, 1891.

To PETER H. BRYCE, M.D.,
Secretary Provincial Board of Hea'th,
Toronto, Ontario.

DEAR DOCTOR,—Your circular letter of November 25th is before me, stating reasons why you have not notified the different State Boards, concerning the presence of small-pox in Ontario, as required by agreement. For this accept my thanks. Permit me to suggest, however, that your communication contains more than is required by the agreement of the Conference, or by the present circumstances. I do not understand that you are specially called upon, or competent to advise all the State Boards in the United States and neighbouring countries as to just what should be the action of the Michigan State Board of Health, or of its Secretary, in dealing with the interests of life and health of citizens under its care, in this particular case or in any case. My telegram to you before our action was taken in this instance asked you to advise this office on this subject; you did so, and I hereby thank you. Your advice was duly weighed, as also was other advice, and action has been taken. Permit me to suggest that your circular is late, is addressed to too many persons, and contains appearances of a great desire to favor railroad companies, but not so great concern for the safety of life and health in Michigan or states west of us.

You cite, as a model, the action or non-action of the Ontario Board of Health in 1888, when "hundreds of cases of small-pox existed in Buffalo and vicinity this Board deemed it necessary to have only one inspector stationed in Buffalo to keep it informed of the measures which were being taken by the health authorities there for stamping out the disease, and to keep Local Boards along the border on the alert for any cases that might pass over the river." The result seems to have been "fifty-four cases of small-pox with three deaths, in Ontario" Where does the responsibility rest for these cases and deaths? Would not a thorough inspection service between Buffalo and Ontario prevented them?

The sixty cases and seven deaths in Michigan in 1888, referred to by you, mostly resulted from the introduction of a case of varioloid from Dakota, in a way against which it is not probable that any inspection could have been effective. But it is possible that a thorough inspection service between Ontario and Michigan might have prevented a few of the cases in Michigan in 1888. Eleven cases and two deaths at Lansing were alleged to have resulted from "James Rowe coming from Sarnia, Canada." Two of the other outbreaks were reported as having come from the same source. It is now too late to remedy this; but perhaps it is not too late to stop a repetition.

While you are in error in supposing that the two cases of varioloid, returned to Canada November 12th, were the basis of the action for inspection, the health officer at Port Huron is positive that they were not measles, but varioloid, one of them having twenty or thirty pustules on the face, with "matter under the scabs."

I did not understand that the agreement for inter-state notification of dangerous diseases was entirely or mainly in the interest of railroads and travel, as you seem to imply. My belief is that it it was and is designed mainly in the interests of public health.

Your argument based upon the distance from Quebec to the Western States must have been intended for the "uninformed public," because, in common with all sanitarians, you must know that the two weeks period of incubation of small pox is long enough for an emigrant exposed in Hamburg to cross the ocean and go a thousand miles into this country in time to spread the disease at his destination.

In your circular is a statement by a railway manager that "An inspection against this at Windsor would be very like a Canadian inspection at Detroit against a disease prevailing on the Gulf of Mexico. This seems to me either to ignore the fact of the tide of immigration into Michigan and the North-west through Port Huron and Detroit, or to be based upon ignorance of the fact that there is not a great rush of emigrants from the Gulf of Mexico into Ontario by way of Detroit.

Small-pox is not the only disease (nor the one which should be most feared in Michigan) that is brought into Michigan and the North-western States by immigrants. We need an inspection of immigrants at Port Huron and at Detroit, for reasons which I have not had time to explain to you, and which, if you will exercise your usual good sense, you will appreciate when they shall be placed before you.

Very respectfully,

HENRY B. BAKER,
Secretary.

REPORT OF SECRETARY *RE* SEWERAGE AT ST. MARY'S.

OFFICE OF THE PROVINCIAL BOARD OF HEALTH.
TORONTO, August 13th, 1891.

To the Chairman and Members of the Local Board of Health of St. Mary's :

GENTLEMEN,—Having at the solicitation of petitioners visited the town of St. Mary's and investigated with your board and members of the Council, the cause of the complaint, I have the honor to report the following opinion as to the most practicable method of remedying the evil.

To comprehend the situation properly, the following points must be considered :

1. That the stone drain, laid many years ago, without a perfect grade, was intended only for draining cellars and for carrying storm-water, and hence was not constructed in such a way as to prevent accumulations of solid materials at some points, or soakage from the drain into the surrounding soil at others.

2. That while the level of the drain at its outfall may at the time of construction have discharged the sewage into the river, yet the annual lowering of the summer level of the river makes the accumulation of the sewage at the outfall a serious nuisance.

3. Hence there are two sources of nuisance, each requiring to be abated.

With regard to the first, it is manifest that it is necessary :

1st. If the present sewer to allowed to exist, it must be cleansed, and kept so. This means the cutting off of polluting sources, such as drainage from cesspools, privies, water-closets, etc., in other words, that without a regular water supply for proper flushing, after a new good grade has been established, it should be used only for drainage of cellars and storm-water.

2nd. The nuisance caused at the sewage outfall would in this way be permanently remedied, if existing deposits were removed.

3rd. As, however, it does not seem a wise, or perhaps practicable procedure to remove the nuisance in the manner indicated, since slop-waters at least must always require to be dealt with, it seems desirable that the question should be dealt with along the line of more modern methods ; *i.e.*, utilising the sewer to its fullest capacity, but in a sanitary manner. This may be done by—

a. When the weather is cooler, opening up existing sewer, cleansing it, laying it at a true grade from end to end, and cutting off from it all house drains. Using it only as a storm-water sewer delivering at the river's edge.

b. Laying in the bottom of the old sewer a 6 in. to 8 in. glazed tile set in cement, the bottom of the old drain being also rounded and smoothed with cement.

The following will illustrate :

This tile sewer must be supplied at proper distances with manholes for inspection, and an automatic tank for flushing it at the head of the sewer. Opposite each lot tiles connecting with main by a Y should be laid, thus providing for house connections. These may then be connected with by householders under the supervision of the town engineer.

c. This sewer might be in the meantime extended into the current of the river as an iron-pipe.

Should the use of public water be introduced into St. Mary's and a general sewerage system be established, provision would have to be made for disposing of the sewage in some way, other than into the river.

d. This small sewer is to be a carrier of sewage only, and every householder using it would be assessed a proportion of the cost of construction, as a local improvement.

A number of other serious unsanitary conditions were observed, to which I drew the attention of the Board.

The most notable is the use of water in the lower part of the town from surface wells, some of which are undoubtedly polluted and dangerous. These must be closed by the Local Board wherever polluted.

The next is the existence of privy-pits in populous parts of the town. By the adoption of cheaply constructed dry-earth closets, this evil could in large measure be removed,

Trusting to learn at an early date that action has been taken in this matter.

I have the honor to be,

Your obedient servant,

PETER H. BRYCE,
Secretary.

COMMUNICATIONS *RE* TRANSPORTATION OF THE DEAD, ISSUE OF BURIAL PERMITS, AND THE UNDERTAKERS' BILL.

To WM. EDGAR,
General Passenger Agent, G. T. R.,
Montreal.

TORONTO, January 13th, 1891.

DEAR SIR,—I have the honor to report to you the result of the discussion by the Committee on Epidemics *re* the proposed rules for the transportation of dead bodies.

The following is the Committee's resolution with regard to the matter.

Moved by Dr. Covernton, seconded by Dr. Cassidy :

"That the Committee having considered the regulations submitted to the Board by the Grand Trunk Railway *re* "Regulations for the Transportation of Dead Bodies," would reiterate the views expressed by the Board in resolutions adopted at the quarterly meeting in May, 1889, and further, that the Committee forward to the railway authorities the Health Acts and regulations of the Board bearing upon this matter, with the request that the railways adopt rules in accord with the Board's views as therein expressed." Carried.

RESOLUTIONS.

1. That the rules for the transportation of dead bodies submitted by the National Association of General Baggage Agents are in accord with the views of Sanitarians, and are calculated to prevent the spread of contagious diseases.

2. That in the opinion of this Board it is desirable that the practice of transporting the bodies of persons dead from dangerous communicable diseases be discontinued, owing to the impossibility of at all times preventing persons who may have been infected, owing to their contact with the corpse, sick-room, or persons who have been in contact with the sick from coming in contact with other susceptible persons.

3. So long, however, as dead bodies are transmitted by rail this Board would recommend, that the following diseases in addition to those included in Rule 1 of regulations submitted be absolutely forbidden rail transport, viz., diphtheria, anthrax, scarlet fever, measles, and puerperal fever.

4. In those cases where corpses are transmitted it is the opinion of this Board, that inasmuch as undertakers are not examined or licensed in this Province at present, it is imperative that the preparation of the body and the other details of the funeral, be supervised by the Medical Health Officer, whose affidavit must be obtained to the effect that every precaution under the Public Health Act has been taken.

5. It is further, in the opinion of this Board, imperative that the Medical Health Officer of the municipality to which the body has been consigned be notified of the hour of its arrival within his jurisdiction in order that he may supervise its burial.

A similar communication has been addressed to the Canadian Pacific Railway Company, and the Board trusts that the railway companies will aid it in preventing in every practical way the dissemination of infectious diseases.

I have the honor to be
Your obedient servant,

PETER H. BRYCE,
Secretary.

P. S.—To illustrate the point that transportation of corpses ought to be discouraged, I refer to a fact brought to my attention this morning. It is as follows :

According to the newspaper notice of death, J. McC. died at Thorold of typhoid fever on 9th of January, 1891. The Grand Trunk permit for transit states that J. McC. died at Thorold on 8th of January, 1891, of bronchitis.

The certificate given by the attending physician is to the effect that J. McC. died on the 8th of January, of pneumonia. The certificate is dated Thorold. The body was transported to Toronto *via* the Grand Trunk Railway and buried here. It was forwarded in an ordinary wooden case, no precautions whatever of a disinfectant character having been exercised before forwarding body. Comment is needless.

PROVINCIAL BOARD OF HEALTH,
TORONTO, June 17th, 1891.

E. HOPKINS, ESQ.,
672 Yonge street,
Secretary Toronto Undertakers' Association.

DEAR SIR,—In reply to your request in a conversation had recently with you, that I make some suggestions with regard to the rules which should guide undertakers in dealing with the funeral of persons dead of contagious diseases, I would say, that the Provincial Board has at various times made regulations for the guidance of Local Boards under section 9 of the Public Health Act, in addition to the laws laid down in various clauses of said Act.

For instance the Vaccination Act and Small-pox regulations herewith forwarded, serve as a guide in such cases ; while at page 54 of the report of 1886, which I send you, you will find regulations drawn up with reference to diphtheria.

I think it would be well for your Association to direct the City Health Officer's attention to the difficulties you have as undertakers in dealing with funerals in cases of contagious diseases.

These regulations quoted are legal guides under section 9 of the Act, and if section 7 of said diphtheria regulations were carried out your difficulties would disappear. I think it most desirable that the City Health Officer should issue printed rules to all undertakers in the city, in which the sections of the Act contained in the previous clauses of these above mentioned regulations would be printed, while he could draw special attention to clause 7. In such instances where he thought the undertaker a man who would carry out directions in good faith, the Medical Health Officer could very well delegate the duties laid upon him with regard to superintending the preparation of the corpse, and the disinfection of rooms to the undertaker ; in other cases his inspectors would carry out the Regulations.

Regarding the transportation of bodies, the railways have now a set of rules with regard to the preparation of bodies prior to transportation. The method for properly carrying out this work, would be for the undertaker to obtain the attending physician's certificate as to cause of death and present it to a Medical Health Officer, who would exercise his judgment as to the propriety of issuing a transportation certificate. In any case where he had reason to doubt the accuracy of a death certificate, he would naturally defer issuing the transportation certificate until he was satisfied as to the non-contagious nature of the disease.

You are aware of this Board's views with regard to transportation. I send you a copy of the resolutions adopted by it on the subject.

I shall be glad to aid your Association in getting this matter into shape in any way that may seem agreeable to you, and shall endeavor, if you wish it, to get the railways to alter their at present unsatisfactory certificates.

Trusting to hear from you at your convenience,

I am, yours truly,

PETER H. BRYCE,
Secretary.

NOTES—RE UNDERTAKERS' BILL.

The principle involved implies the establishment of a school, where :

1. Undertakers can be educated in the Arts of their work.
2. Where they will learn the causes wherein lie danger from dead bodies.
3. They will learn to avoid them.
4. They will study the phenomena of contagious diseases.
5. The most approved methods of dealing with bodies dead from them.
6. Of disinfecting rooms and houses where they are.
7. Of disinfecting hearses and other vehicles, and of conducting transports properly.
8. It places them under the regulations of the Provincial Board of Health regarding these matters, the condition of registration being dependent upon the adhesion to such regulations.
9. The public safety is thus assumed in regard to funerals in cases where the Local Health authorities might be dilelict.
10. No person is prevented from performing any burial rites as heretofore : only that those who are making a business of undertaking may be recognised by the public, as being those who presumably have a technical knowledge of the Art.
11. It is in a peculiar sense, a department of public sanitation.

REPORT *RE* PROPOSED SEWERAGE SYSTEM FOR TORONTO JUNCTION.

TORONTO, May 14th, 1891.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your Committee on Sewerage and Water Supply has the honor to submit its report on the plans and specifications herewith attached *re* the proposed scheme of separate sewerage for West Toronto Junction.

Before discussing the details of the system it may be stated that the position of Toronto Junction situated as it is to the west and north-west of the city of Toronto, and bordered roughly on the west by the Humber, at once indicates that any system of sewerage there established must be considered as related to the conditions appertaining to the sewerage systems and water supplies of neighboring municipalities, but notably to those of Toronto.

From the plans it will be seen that at present West Toronto Junction obtains its water supply from Humber Bay at a point 700 feet from the shore, and 2,500 feet from the mouth of the Humber. This Board, it will be remembered, pointed out at the time the plans for these waterworks were submitted to it, that while the Board could not reasonably object to the source of supply under the then existing conditions, the town must expect when in the near future it would naturally inaugurate a sewerage system, that the difficulty of disposing of its sewage would become apparent. The scheme proposed makes this point abundantly evident.

It will be seen from Mr. Kuichling's report that he has fully recognised this fact, and that he has at some length endeavord to produce conclusive evidence that danger to the Toronto water supply from this source need not be apprehended. He, however, somewhat illogically makes the recommendation that the town of West Toronto Junction remove the location of its intake water pipe to a point some three miles further west. Your Committee is glad to know that Mr. Kuichling believes that there is at least a limit to the proximity which may exist between a water intake and a sewage outfall, compatible with perfect safety to the public.

With these preliminary remarks the following consideration of details are submitted :

1. The history of the Toronto waterworks is of interest, as it illustrates what has taken place in all the larger cities which have grown up along the great lakes. The intake pipe was first placed in the bay at a short distance from the shore. Later the pollution of the bay created the necessity of carrying the pipe across the bay and establishing a filtering and settling basin near the light-house on the island. This at length became polluted, and being injured by storms caused the removal of the intake pipe to its present position near the bell-buoy, where it has till recently been considered perfectly safe from all future danger of pollution.

During the past several years some doubts on this point have been expressed and the series of analyses recently published by Dr. Ellis, would seem to show that at any rate as regards organic pollution, some cause has been at work which has degraded the city water from the high rank it possessed only a few years ago.

That this is due to sewage reaching as far as the intake pipe in quantities sufficient to be measured by chemical analysis, we do not require to admit ; but that that is possible, is we think, beyond question when the relative position of the intake-pipe to the eastern and western gaps

is considered. From Prof. R. R. Wright's analyses made so long age as 1886, in which it was shown that while the number of microbes in the water at the bell-buoy was .0 at the pumping well the number in the sample for the western gap was 4,500 per c. c.

Remembering further, that the sewage of to-day is probably 50 per cent. greater than it was in 1886, it is only reasonable to conclude, that as the ice of the bay with a westerly wind is frequently swept out within a single night, so the bay water and its sewage is with westerly winds moved rapidly out of the eastern gap. It needs only a change of wind to the east, such as we know frequently takes place, to turn this surface current westerly along the outer side of the island, when within an hour or two it will have reached the vicinity of the intake-pipe. It must further be remembered that with so great a volume of sewage the constant element in this pollution becomes increased, *i. e.*, the organic deposits along the shores of the island, the marsh, etc., of heavier matters become a permanent factor in this question of pollution. Hence the tendency is toward a permanent deterioration of the quality of the city water. Many analyses of the great lake waters by Dr. Ellis have shown a permanently high constant in their vegetable organic compounds as compared with English standards, going to show that the complete decomposition of this matter is positively never accomplished, owing to the continued pollution by the vegetable materials carried down streams. That sewage matters may add to this might have been inferred, and the history of the city water seems to prove this, as also does the history of the Parkda e water supply.

As a separate municipality Parkdale established a public water supply and a sewerage system, the intake-pipe of the water supply being only a few hundred feet from the shore (685 now 1500 feet), while the main sewer discharged at a point some 3,000 feet from it. Progressive pollution had become with the recent rapid growth of Parkdale so marked that typhoid became endemic there, and remained so till the water-works Committee recently considered the advisability of stopping pumping from this polluted source. Whether Parkdale and Toronto bay sewage polluted Toronto Junction water supply has not been ascertained, but it is certain that the latter town has suffered during the past year to some extent from the prevalence of typhoid.

Remembering the shallow beach extending out into Humber bay for thousands of feet, as well as the state of the bar and the long exposed shore, the character of the water there will tend always to be inferior to that at the point of the Toronto intake under normal conditions. This is also increased by the deposits from the Humber, while with the increasing growth of the city westward, with the growth of the new town of Mimico, and of lake-side residences, there will be created another source of pollution tending to a constant degeneration of the high standard of Lake Ontario water in the vicinity of Toronto.

WATER AT BELL-BUOY JULY, 1886.

Appearance : clear, pale greenish yellow

Chlorine	3.0
Free ammonia	none
Albuminoid ammonia	0.02
Oxygen absorbed in 15 min	0.15
Oxygen absorbed in 4 hrs	0.58
Total solids	124.00

WATER AT BELL-BUOY MARCH 6TH, 1891.

In parts per gallon.

Appearance : Turbid

Chlorine	4.00
Free ammonia	0.08
Albuminoid ammonia	0.16
Oxygen absorbed in 15 min	0.88
Oxygen absorbed in 4 hrs	1.50
Total solids	162.50
Organic impurity according to Muter's scale	0.67

2. So far the history of the water front of seven miles has been considered. Your committee however, in considering the question submitted to it, must have regard especially to the future. Toronto and its suburbs has much more than doubled its population in ten years. Like all the great lake-side cities, it may be expected to expand very greatly in the next ten or twenty years. Assuming that this is true and that a proposed trunk sewer for Toronto is built with sewage outfalls at points similar to those indicated by various engineers reporting recently on it,

the history of water pollution in the past, will, your committee believes, be exemplified in an increasing ratio in the future. The eastern sewage outfall cannot without enormous expense be carried, it is believed so far east as to seriously alter those conditions which, as the history just summarized shows, have tended to rapidly deteriorate the purity of the Toronto water supply. In fact there is some reason to fear that outfalls located three or six miles east of the water intake would not prevent the rapid movement of the sewage before it is decomposed directly toward the intake-pipe under favoring winds. Whatever æsthetic evils are produced by sewage being poured into the bay it is very probable that its detention in the bay serves in quiet weather to give time for a considerable degree of decomposition, and therefore purification, before it passes out to the line where it can be drifted toward the water-pipe ; although this latter danger is constantly increasing.

But the Toronto trunk sewer scheme further contemplates a western outfall very near the present Toronto Junction water intake. With the history of the pollution of Parkdale water, this proposition seems to have been made without due regard for the rights of Toronto Junction to obtain water from the source available for the several lake-side municipalities. Manifestly it would be as improper, and much more unreasonable, since Toronto has a possible easterly sewage outfall, that another outfall for the city should be located in Humber bay, as that Toronto Junction should be allowed to construct a new sewerage system with its outfall into Humber bay.

(Reference was here made to the several plans contained in the two reports submitted.)

3. Dealing briefly then with the reports submitted and the plan recommended by the consulting engineers to Toronto Junction, your committee would say :

(*a*) That it cannot in any way agree to the proposition to pour the sewage into Humber bay so long as Toronto Junction takes its water from the present source.

(*b*) That while the pollution of the bay by the present population of the Junction would not in all probability affect seriously the purity of the Toronto water supply, yet as the system proposed is for a city of 30,000 to 40,000 inhabitants, it becomes the duty of this Board under section 30 of the Public Health Act to view the proposed scheme from this standpoint.

(*c*) The scheme proposed contemplates the removal of the town's water intake-pipe to near Mimico, and suggests that Mimico take its water supply from West Toronto Junction. Your committee's experience is, however, that most municipalities prefer controlling their own water supplies.

But whether this were done or not, it does not remove the future danger to this source of supply, from the fact that Mimico will be soon forced as the Junction is now, to adopt a sewerage system, and could with the same reasoning with which Mr. Kuichling in his report adopts with regard to Toronto water supply, say, "We shall remove our water intake-pipe to some point further west, thereby preventing its pollution, and Toronto Junction must look out for itself in the matter of its water supply."

Any argument based on the supposition that Mimico will not grow to such an extent as to create such a danger could be sufficiently refuted by pointing to the history of the Junction itself.

(*d*) Since these several points indicate the conclusion that it is unwise in the public interest for the scheme C (of Mr. Chipman's report) favored by the engineers to be adopted by the town, viz., that of pouring sewage into Humber bay, it may fairly be demanded of your committee by the town council, which of the other schemes proposed meets with its approval. In reply to such a demand your committee would say that scheme A proposed in Mr. Chapman's report, is that which would be most free from present objections, since it would add a relatively small amount of pollution to Toronto bay at the old fort ; and further, it would not create a new problem in addition to that of the Toronto question.

(*e*) It would prevent the construction of an expensive main sewer to Humber bay which might prove useless in case the Junction at some future time decided to join in with the Toronto sewer scheme and would further remove the necessity for the three mile water-pipe to Mimico point, although an extension into deeper water of the present pipe is certainly desirable.

(*f*) Should it be objected that scheme A will necessitate the establishment of three pumping stations, your committee would say in reply that as the population of the area, the sewage of which would have to be pumped does not now exceed 1,500, the amount of sewage pumped, with this population increased to 5,000, would not be more than 30,000 gallons per diem, which amount and much more can be pumped by one or two windmills at the sewage outfall on Bloor street with tankage enough for a day's supply in case of absence of wind. Should the scheme of pumping to Dundas street, at the end of this period be found to be favorable as a permanent one, steam power could then be made to replace the latter.

(*g*) But should a more permanent method of disposal of the sewage of the town be considered necessary at once independently of the city of Toronto, it appears to your committee that the purchase of suitable land would be a practical procedure ; since it would be at once available as a sewage farm for present needs, the sewage being carried there by gravity, or at some later stage would form an admirable location for works where chemical or electrolytic precipitation and subsequent filtration of the effluent might be carried on.

(*h*) Finally, it is desirable that the construction of any expensive trunk sewer to the Humber be delayed owing to the scheme at present being considered by Toronto for obtaining a public water supply by gravity.

This if successful will greatly simplify the whole question of sewage disposal for the several lake-side municipalities.

All of which is respectfully submitted.

P. H. Bryce.
J. D. Macdonald.
H. E. Vaux.

REPORT OF SECRETARY *RE* DISPOSAL OF SEWAGE AT AGRICULTURAL COLLEGE.

Toronto, June 5th, 1891.

Hon. John Dryden,
Minister of Agriculture.

Dear Sir, —In accordance with the instructions contained in your letter of the 2nd inst., I proceeded to the Agricultural College on the 3rd and investigated the arrangements for the disposal of sewage.

The amount of sewage daily discharged from the college averages 3,000 gallons. It receives on its way to the tank house about 12 lb. of ferozone precipitant daily, and is allowed to settle in the tanks for 24 hours. Each evening the clear upper fluids are carried off to the filtering ground and the precipitated portion or sludge is swept from the bottom of the tanks into a conduit, and thence discharged into a box containing about 12 cubic feet on a sled.

The filtering ground is a flat bed of a gravelly clay loam, 100 feet by 75 in area, and is divided into two parts, each of which receives on alternate days the sewage of 24 hours.

Beneath the filter beds are 7 field tile drains at a depth of about 2½ feet increasing to 3. The outfall of these is about 2 feet above the present level of water in the creek.

The sewage is delivered on the field from a horizontal box 6 by 8 inches with six gates to distribute the sewage evenly on the field.

At the rate of 3,000 gallons daily, each of the 75 by 50 feet beds if perfectly level would be covered by a depth of sewage water nearly 2 inches deep which has 48 hours to disappear, either by evaporation or into the ground, whence it filters to the tile drains and passes into the creek.

Such is the basis upon which the filter ground is supposed to dispose of the sewage.

On inspection I found the following :—

1 That the precipitant arrangements and tank-house are in good order. That the horizontal box which distributes the sewage is not washed down, and hence sewage clings to it and decomposing produces slight odors.

2. That the beds are not level, and that not 50 per cent. of surface of either bed is covered daily. From this results that the sewage accumulates several inches deep at the low points, and hence not descending rapidly enough into the ground has time to decompose on the surface, and therefore produces some odor.

3. That the surface of the beds have never been cultivated or loosened up in any way, and hence are baked hard and do not absorb rapidly, and do not admit air into the soil readily.

4. That only one of the subsoil tiles was delivering any water into the creek and this did not amount to more than 55 or 60 gallons of clear water in 24 hours.

5. That there is absolutely no sewage pollution of the creek, and that the complaints of persons resident on the creek below are absolutely without cause.

6. That the sewage sludge is at present deposited in the barnyard instead of being daily deposited on some plowed field.

Recommendations.

(*a*) In order to give the filter a chance to do its work, which I think is at present of sufficient area if carefully attended to, I would suggest that the two beds be divided into four beds by a little embankment, and that all be brought to a perfect level or so nearly so that the sewage will be evenly distributed on each By this arrangement each bed would have four days wherein to dispose of its sewage and to have the surface kept loose and ready to absorb the next charge of sewage.

(*b*) To remedy to some extent the necessity for so frequent loosening of the surface and to promote rapid filtration, I would recommend that for comparison, two of the beds be covered respectively with 4 and 6 inches of fine gravel. The sewage will at once sink below the surface of the fine gravel and surface decomposition will be prevented.

(c) The distribution of the sewage can be made more perfect over the bed by laying field tiles from the main carrier under the gravel across the filter beds.

(d) The box drain serving as an open sewage carrier should be either washed down frequently or, better, should be replaced by a few glazed tiles with offsets to the distributors on the beds.

(e) The sludge which is removed daily by sled to the barnyard, may with advantage be drawn directly to a fallow ground, distributed along a furrow and so plowed in.

Trusting that these several details may at once be given effect as the hot weather is coming on, and even the semblance of a nuisance will be detrimental to the good opinion, which I trust will grow regarding sewage farms.

I have the honor to be,
Your obedient servant,

PETER H. BRYCE,
Secretary.

THE PRESENT POSITION OF THE MILK-SUPPLY PROBLEM FROM THE PUBLIC HEALTH STANDPOINT, AND SOME PRACTICAL METHODS FOR SECURING SAFE PUBLIC SUPPLIES*

BY THE SECRETARY.

GENTLEMEN,—During the interval since our last meeting I have been requested to introduce for discussion a paper on "Public Milk-Supplies." In order to properly lay before the association a subject so broad in its practical bearings and so replete with important and interesting details, a paper greatly extending the limits of time allowed for any single subject would be necessary. I shall, therefore, deal briefly with the first part of my subject, in order that I may discuss at greater length those numerous details with which every executive officer of health ought to be familiar.

1. *The Use of Milk as a Food.*—Perhaps nothing will better indicate the importance of guarding this source of food-supply, than to recall the enormous consumption of what from earliest times has been more or less universally used as food by all nations. It is the natural food of all young mammals, whether human mammal or beast-mammal. "Milk, from the earliest times," says Dr. Wynter Blythe, "even when its composition was most imperfectly known, has been considered the type of foods." Statistics may be given to illustrate the extent of the use of milk and milk products.

In the province of Ontario, 737 cheese factories were reported in operation in 1888. Calculating from returns made by 557 factories, the following table is given:

No. of factory.	Milk used, lb.	Cheese made, lb.	Value.
737	686,369,013	65,299,751	$6,031,470

In 404 factories, with complete returns, the amount of milk used was 402,599,463 pounds from 150,618 cows. The average number of days in which the factories worked was 155, and the average amount of milk per cow was 2,673 pounds. The total number of patrons was 24,644, or about one eightieth part of the population of the province.

Assuming that two-thirds of the population of Ontario is agricultural, we may say that but one-tenth of the total production of milk in the province for 155 days, or less than half a year, was utilized for cheese-making. Now, if we multiplied the quantity of milk by ten, and added a half for the number of months remaining, we should have the enormous total of over 10,000,000,000 pounds of milk produced during a single year, or fifteen pounds *per capita per diem*.

Remembering that the great bulk of the cheese-products are exported, and that butter and milk are the chief foods used in Ontario, it is quite probable that this statistic is not greatly overestimated.

The report of the Ontario Bureau of Industries for 1890, states that there were in the province that year only 175,000 farmers, having 777,838 milch cows. We have, however, to add to these the many thousands of cows which are kept for purely milk-supply purposes by people in the cities, towns and villages.

* Read at the nineteenth annual meeting of the American Public Health Association.

From statistics, I find that in 1890 the number of cows in the United States is given as 15,952,883, each yielding, on an average, 450 gallons per year, or a total of 6,750,000,000 gallons; and that only five per cent. of this total is used as butter and cheese, the balance 95 per cent. being used as milk in its natural state. If all were sold at 12 cents per gallon, it would amount to $810,000,000. In New York State there are 1,552,373 cows.

If, then, this single food-product, having a value so enormous and in itself a perfect food, is to be continued as a universal food, it is apparent that this association cannot engage itself with any single subject with such potentialities for good as this food of the nation, or such possibilities for evil, if we admit that it may possess, or become the medium for disseminating ills, perchance as numerous as those from Pandora's box.

When we think that in the United States there is one milch cow to every four inhabitants and that one hundred gallons *per capita* is the amount of milk produced annually, we have some idea, not only of the magnitude of interests involved and of the use of milk and milk-products, but also of the enormous task involved in maintaining these 15,000,000 milch cows in good health, and in protecting the milk, when produced, against pollution. There are in the United States 42,000 (graduated in ten years) physicians, whose duty I assume to be to maintain the people in good health or to heal those who are sick. What number of veterinary physicians is there, I ask, who are devoting their attention to the problem of maintaining these milk-producing animals in health, or in preventing evil results from attending the use of milk, unwholesome at the time of taking from the cow, or in its often strange and eventful history up to the time it reaches the consumer?

When we refer to the infectious diseases alone, which affect the bovine species, we see that they are of a number and character such as to urgently demand close attention and systematic supervision. Thus, they are subject to cancer, tuberculosis (in its several forms of scrofula, phthisis pulmonalis, tabes, tubercular meningitis, glandular tumours, etc.), actinomycosis, anthrax, symptomatic charbon (or black quarter), milk sickness or "trembles," rinderpest or cattle plague, Texas cattle fever, vaccinia, scarlatina, parturient septicaemia, pyaemia, septicaemia, septic mammitis, glanders, diphtheria and croup, rabies, trichina, taenia, echinococcus, pleuro-pneumonia, eczema contagiosa (foot and mouth disease), etc.

In this extended list I have selected diseases, every one of which has been probably known to this continent, and some of them, unfortunately, too well known. As a rule, it is not those *maladies fulminantes*, slaying whole herds in a few weeks, that cause us alarm in the matter of milk-supply, but rather those less acute diseases, which, owing partly to ignorance partly to carelessness, and not infrequently to culpable cupidity, while not depriving a cow wholly of her milk-producing ability, are disseminated in milk-supplies to an extent proportionate to the numerous opportunities offered and to the vulnerability of the person taking the milk.

The past has legends enough of animal disease spreading to man, which, with greater care, to-day are not so commonly seen; but we are not wanting in illustrative cases. Thus, during the past summer anthrax appeared in an Ontario county in cattle feeding on bottom lands along a creek below a tannery where South American hides are used. Several animals had died suddenly, from what was supposed to be chemical poisoning due to the polluted water from the tannery. The matter being brought to my notice, I investigated, and suspected anthrax, which was verified in my laboratory. In the meantime another cow sickened. She was milked in the evening, and some one luckily suggested the advisability of not using the milk. It was given to some young pigs. Two died within four days thereafter; the majority recovering, as frequently takes place in pigs. Thus in England and Wales, out of 210 pigs attacked with anthrax in 1890, 117, or over 55 per cent., recovered.

In this outbreak just referred to, a man who, after being warned regarding the nature of the disease, skinned another cow which had died, intending to surreptitiously dispose of the skin, became inoculated, and lay for sometime in a dangerous state.

Of those diseases, however, which, owing to their less acute character, we have most difficulty both in detecting and eradicating, actinomycosis is taking a place prominent in the degree that its nature and prevalence are being recognised. On a single day four head of cattle infected with this disease were received into the Toronto cattle market, and the disease has by statute this year been placed amongst those scheduled as unfit for human food. Some of the dangers of its spreading and of the difficulties in dealing with it, are admirably set forth in the annual report for 1890 of the health officer for Chicago.

But, as compared with other diseases, the one which must be recognised on every hand as being, *par excellence*, that to which sanitarians, medical health officers, and physicians must devote their special attention, is tuberculosis. That tuberculosis causes one-seventh of all the deaths of the human race is stated by reliable statisticians; that it prevails in almost every land is well known; that it is disseminated everywhere on the American continent is equally well established; and that it has greatly increased in prevalence is unfortunately too true. That, until recent years it prevailed but little amongst American cattle is probable; but that it has increased, as animals improved by in-and-in breeding have been imported for stock purposes,

is well known ; and that it has been rapidly developed by the growth of dairying for the supply of milk to the enormously increased populations of our American cities has now become a well authenticated fact. These facts are sufficient to cause us to pay some special attention to the more prominent points of interest associated with the disease in milch cows.

In 1890, of all the cattle slaughtered in Berlin, 4.5 per cent. were tuberculous ; while in Upper Silesia, 9.5 per cent. of all slaughtered in a single abattoir were tuberculous. Bitter affirms that, while statistics are not extant, there are, he has reason to believe, at least 10 per cent. of dairy cattle tuberculous in cities and their environs. No precise statistics have anywhere been tabulated regarding the prevalence of tuberculosis in dairy cattle in British cities, but that it is much too prevalent may be gathered from evidence such as that published by the Local Government board's report regarding tuberculous meat in Glasgow. The reason for the absence of such reports is that tuberculosis is not included in the list of contagious diseases in the (Animals) Contagious Diseases Acts of England and Wales, and animals affected with it can only be got at by the by-laws regarding unwholesome meat and milk. In the report of the Veterinary Department of the English Board of Agriculture for 1890, the following occurs in a paragraph referring to tuberculosis being placed on the list of contagious diseases in animals : "Recently the subject has been brought to the notice of stock owners and dealers in a very pronounced way, in consequence of the very frequent seizure by sanitary authorities of carcasses of animals, which, after being sold in open market as healthy cattle in fine condition, had been found affected on post-mortem examination, and had been confiscated without any compensation to the purchaser, who had acted throughout in good faith, as also had the seller and all other persons concerned in the transaction."

"That the sufferer should appeal to the government for compensation was natural, since they asserted that, (1) The fact that many animals apparently healthy show after slaughter tuberculous disease, and, (2) That there is no ground for seizure and destruction of meat which was perfectly healthy to the eye of the meat inspectors, merely because some of the internal organs were affected with tubercles."

A royal commission has been the outcome of these representations, which is inquiring into the degree of infectiveness of the meat of tuberculous animals.

The same report gives the results of some experiments carried on during several past years to determine this important point. The following facts are granted, viz. :

(a) Lower animals may be infected with tubercle derived from the human subject.

(b) Bovine tuberculosis is communicable to other animals by inoculation, and by feeding with tuberculous material.

(c) A peculiar character of bovine tubercle, "grapy' form (perlsucht), does not appear in any animals as the result of experiments.

(d) The inference that man is susceptible to infection from the lower animals remains, and must always remain, based on analogy, direct experimental proof being unattainable.

The experiments undertaken were with the intention of determining whether meat of tuberculous origin, yet not containing any obvious tubercles or any tubercle bacilli detectable in microscopic examination, is capable of producing tubercle.

The experiments were carried on in three sets. In the first series, where seven rabbits and six guinea-pigs were fed upon muscle from undoubted cases of tuberculosis in cattle, post-mortem examinations, all within a few weeks (three or four months), showed that ten of these animals or 77 per cent., were affected with tuberculosis ; while five animals fed on milk from cases of undoubted tuberculosis, or on material other than milk from doubtful cases, were all, without exception, found to be in a normal and healthy condition.

In the second series, nine guinea-pigs were fed with tuberculous muscle mixed with oats and bran for five days. The feeding took place in the middle of December, 1890. On January 2nd, one animal was taken from each of the three cages and examined post-mortem, and not a trace of tubercle was found in any. From the 3rd January to the 10th, the remaining six were fed with pressed meat juice added to bran and oats ; thereafter on ordinary diet. On January 14th, one died, and was found to have tubercular disease. On the 20th of January, another died with pronounced disease of intestines. On January 22nd, a third was found dead with extensive disease of lungs, liver and spleen. All of the remaining animals of the series showed pronounced tubercular disease, especially of organs of the alimentary canal. The two central animals, fed on bran and oats only, were killed early in February, and were found perfectly healthy.

Here the percentage of well marked cases of tuberculosis in animals fed on muscle or juice was 75 per cent.

A third series of experiments, carried on in Edinburgh, in the laboratory of Professor McFadyean, were negative in their results, and comparable with similiar experiments by Nocard and Bollinger. Professor Brown remarks, regarding these three sets of experiments : "On the other hand, the first and second series of experiments leave us no room for doubt that meat taken from tuberculous cattle, the tubercle being trimmed off without any special precautions,

exactly as is done by the butcher, is capable of causing the disease in animals which partake of it in a raw state. The further question of the degree of cooking which is necessary to destroy the infective character of the meat, has yet to be determined by experiment."

I have made this reference to diseased meat, since it is intimately related in its bearings to the question of the power of milk to transmit the germs of disease, as tuberculosis.

From Koch's first experiments, and from those of numerous investigators since, it seems to have been proven beyond doubt that tubercular nodules in the udder are a source by which the bacilli of tuberculosis are directly transmitted with the milk. This point seems to be settled as definitely, as that flesh with tuberculous matter in it is infectious. That this danger is a serious one, is seen from German statistics already quoted, and from other data where, as in Edinburgh, of 660 cows, 37 had tubercular mammitis. How far milk from tuberculous cows with no tuberculous nodules of the udder is tuberculous (as far as clinical examination goes), is a question of even greater importance than that of whether or not meat with no tubercles is capable of transmitting the disease.

Some recent experiments in Denmark seem to show that the danger, at this stage, of transmitting tuberculosis is not very great. The question, however, of at what stage the milk of a cow affected with progressive tuberculosis becomes dangerous, or infected with bacilli, is of such paramount importance that it is one which we may very properly consider. The following are the most recent conclusions on the subject, based upon actual experiments:

The report of the recent Paris congress on tuberculosis does not seem to have added any special light on the subject; but the experiments carried on by Dr. Ernst, of Harvard University, seem to have been so extended and thorough as to leave no doubt as to the dangers from this source. The report states that veterinarians give instances of the infection of calves from tuberculous mothers; and that this is true is undoubtedly shown from M. Vignal's experiments, as related at the Paris congress, from which the conclusion is drawn that it is transmitted from mother to fœtus during pregnancy only in extremely rare cases.

In Dr. Stone's experiments, conducted under Dr. Ernst, 126 separate microscopic examinations of milk from affected cows were made, and in sixteen instances the tubercle bacillus was found, or in 13 per cent. of cases. The report further says:

"By inoculation of the same milk in rabbits and guinea-pigs in seventy-four inoculations we produced six cases of tuberculosis, the inoculation being from only one to three drops of milk. This means in 8 per cent of rabbits and in over 13 per cent. of guinea-pigs.

"From feeding experiments with twelve pigs, nearly 50 per cent. became tuberculous, and of twenty-three calves, eight, or 23 per cent, became tuberculous."

That the milk in public supplies may be dangerous has been shown by tubercle bacilli being discovered in mixed milk in Boston, and also from Foster's experiments, who found that tubercle bacilli may exist in milk for at least ten days.

How much value can be placed upon these experiments, viewed from the practical standpoint cannot yet be determined; but it is fair to say that if an inoculation of milk is made with many forms of bacteria, they seem to find milk to be a very good culture medium. That all, however, is not known on this subject must be confessed, and that the fluid tissues of the body and their secretions exert in their normal condition certain protective influences against the invasion of disease has been established beyond doubt.

Many are doubtless familiar with the results of the remarkable experiments which have been carried on during the last three years, growing out of Metchnikoff's phagocyte theory. From these it becomes evident that there is another element in the immunity of certain animals against certain diseases, while the same animals will succumb to other diseases. That, for instance, blood serum exerts a certain bactericidal influence is known by foreign researches, as also by those of Professor Prudden. At this point comes the difficulty of deciding what constituent of blood serum possesses the power; and hence it has come about that certain nitrogen compounds have been extracted from the serum, which, when inoculated into animals, produce immunity in certain directions. These compounds have been called tox-albumins, or defensive proteids; and the theory of their action in creating immunity has been stated by Hankin as follows:

"Immunity, whether natural or acquired, is due to the presence of substances which are formed by the tissues of the animals rather than by those of the microbe, and which have the power of destroying either the microbe against which immunity is possessed, or the products on which their pathogenic action depends."

The important influence of these recent studies on our views with regard to the transmissibility of bacterial diseases cannot be overlooked, and doubtless are of much value; but there are two conditions, which, in connection with our present subject, must necessarily exert a potent influence on the normal quality of cows' milk.

The first of these is the healthy condition of the cow at the time of milking, and the second is the preservation of milk in a condition as nearly akin to its normal condition as possible. Without argument, it may be assumed that cows' milk cannot be normally secreted from tissues

that are not in a normal condition. Experience has further shown that by injections into the blood of chloroform, atropine, etc., alterations take place in the blood by which immunity is removed. For instance, Klein produced anthrax in rats after having administered chloroform, it acting as a depressant. Some of these blood changes are readily observable, and, as would be expected, such changes show themselves by alterations in milk—a normal secretion of the tissues. Take the disease of tuberculosis in cattle; after both feeding and inoculation experiments, it is seen that a daily rise of temperature in rabbits, pigs, calves, etc., takes place of 3 or 4 degrees F. Similarly, although no tubercles of the udder may be present, a daily rise of temperature tends to take place. This has been known in advanced cases to produce a stringy condition of milk and precipitate on standing.

Now these facts may be taken advantage of in a practical way in our efforts to determine what constitutes a normal milk. Thus we are brought naturally to the study of milk as a physiological product. Whether viewed simply as a constituent directly of the blood itself, obtained by osmosis, or as a secretion elaborated in the cells of the milk glands, it is found to have in a normal state certain very well defined relations existing between its various constituents. All know the normal constituents in milk to be as generally stated, fat, and solids not fat, which latter are composed of sugar, proteids, and ash. For many years chemists, and of recent years agriculturists, have been intently engaged in determining, from the commercial standpoint, the relative proportions of these, and especially of the so called butter fat. For our present purpose it suffices to know that different breeds, and different animals of different breeds, give milks which are normal, and yet whose constitutents vary notably within certain very well defined limits. Knowing these facts, chemists and others have argued that there is really no such thing as a normal milk standard possible; but these have argued from a limited knowledge of the facts, or, more probably, limited opportunities for drawing general conclusions. Very recently it has been found that while the butter fat in different animals may notably vary, yet if the cow is known to be healthy, and no abstraction of fat nor addition of water has taken place, the several constituents of milk bear to one another a tolerably definite relationship. Contrary to the old idea that milk high in cream or butter fat would show a lessened amount of other constituents, it is now known that with the percentage of butter fat high the other solids are present in a proportionately larger amount. Thus, Professor Cochrane, analyst to the Pennsylvania Board of Agriculture, gives the following results at 60 degrees F.:

No.	Sp. gr.	Fat.*	Total solids.	Solids not fat.
1	1,029.6	3.38	11.33	7.95
2	1,030	3.62	11.93	8.31
3	1,029.3	3.63	11.63	8.02
4	1,033	5.70	15.64	9.94
5	1,034	5.35	14.87	9.52
6	1,034	5.19	14.70	9.51
7	1,034	5.88	15.48	9.60
8	1,034	5.05	15.69	9.64
9	1,034.3	5.95	15.60	9.55
10	1,035.2	5.70	15.60	9.90

Hence, it is very properly concluded that the lactometer, or lactodensimeter, is an instrument of much value in testing a milk from the standpoint of adulteration. Thus, a milk of low specific gravity and low in solid constituents would indicate the addition of water; a milk of high specific gravity and a low percentage of fat is probably skimmed; and a milk having a low specific and yet a high percentage of fat indicates either a very good milk watered, or an unfair sample taken from the creamy portion of the milk.

From many thousand analyses made by Dr. Paul Veith, F.C.S., analyst for the Aylesbury dairy, London, England, during eight years, broad general conclusions have been drawn. During those eight years he analysed 84,746 samples of milk, and has preserved records of great value, from which the following are some of the more important deductions; He found that the non-fatty solids are the most constant factors in milk, having the following relations to one another:

Total non-fatty solids $\begin{cases} \frac{6}{12} \text{ . . the milk sugar,} \\ \frac{1}{12} \text{ . . mineral matter (ash),} \\ \frac{5}{12} \text{ . . the nitrogenous matter } (\frac{2}{3} \text{ of this being caseine}). \end{cases}$

He likewise found that milk from cows fed with the same food shows a remarkable constancy of specific gravity, rarely falling outside the limits of 1,030 to 1,034.

* Per cent.

As regards quantity, he found that the morning milking stands in relation to the evening as 100 to 72, accounted for, he thinks, by the fact of the cows having before them water during the night, and no food after the evening meal. The great increase shows a difference in quality, but not of an amount to offset the difference in quantity. Thus, analyses made on eleven different days showed in one cow (a type of the others) that the amount of pounds of milk-yield averaged

14.4 pounds at morning milking,
10.2 pounds at evening milking.

Fat solids { 3.5 per cent at morning milking.
4.1 per cent at evening milking.

Non-fatty solids. { 9.13 per cent at morning milking.
9.32 per cent at evening milking.

That these results are constant, may be seen from similar experiments made at the Agricultural College, Guelph, Ont. The following are the results of the average of one week's examination, by Prof. C. C. James, of the milk of six cows by the Babcock tester to show butter fat :

Cow.	Morning milk.	Evening milk.
No. 1	3.25 per cent.	3.96 per cent.
2	2.76 "	4.00 "
3	3.18 "	4.33 "
4	3.42 "	4.45 "
5	2.75 "	4.18 "
6	2.63 "	3.70 "

Dr. Veith further found that the quality of milk reaches its height in November, while in the spring months the poorest milk is received, with another depression in July. The returns were gathered from thirty to fifty farms, and fresh milch cows are obtained at all seasons of the year. It would therefore appear that at these seasons the variations depend upon climatic changes, since the amount and kind of food consumed on the same farms are much the same throughout. There can be no doubt that an influence of an important nature is exerted by weather changes. Thus, a sudden fall in the barometer, and a raw easterly wind, will in twenty-four hours lessen the yield of one hundred cows by a number of gallons ; and a sudden accession of severe cold will, for a day or two, notably lessen the milk-flow. Great heat in the summer similarly affects the milk-supply. But the most notable differences depend upon the kind, amount and methods of feeding. The physiological factor, the perfect or imperfect metabolism of digested products,—in other words, the character of the soluble constituents of food entering the stomach and the digestibility of other foods —forms the most potent factor, under ordinary conditions, in influencing the amount and quality of milk. Ensilage of any kind will give to milk its special flavor, and produce a certain quality as regards richness and permanency ; so also will such foods as bran and various ground grains ; and the same is the case with brewers' grains, fresh or fermented : refuse starch-products, and so on to distillery slops.

Now while there is no doubt that milch cattle become habituated to certain foods unnatural to them, yet the experience of close observers shows that milk always has a physiological normal constitution dependent upon the perfect metabolism of wholesome grains and grasses, and that other foods do produce in some degree abnormal products. All dairymen are aware of how leeks in spring-time flavor the milk, and dairymen are very well aware that so simple a thing as turning cows from permanent pasture into a clover field will produce so notable a taste as to cause complaints of something having gone wrong in the milk.

This subject opens up a wide field for investigation, which as yet has received but little attention, even from the sanitary standpoint. From more or less general experience, the impression exists that the milk of cows fed with refuse grains and ensilage, all including some starch or sugar more or less altered by the alcoholic or acetic ferments, has not the keeping properties of the milk of cows fed with hard grains and grasses. The diarrhœal troubles in children have not infrequently been attributed to this cause. I am not aware of any extended experiments going to show that such milk contains an excess of sugar, and, as already mentioned, Dr. Veith states from his many analyses that sugar maintains its average proportion of one-half to the non-fatty solids of milk, and that these constitutents maintain throughout a remarkable relative constancy. On many of the farms of the Aylesbury Company, brewers' grains are fed, but it may very well be that in the English climate fermentative changes are ordinarily slower than in the warm weather of this country.

This point naturally brings me to speak of the acidity of milk, and its relations to normal physiological processes. We are aware that milk is spoken of commonly as being a practically neutral secretion, giving slight reaction with both red and blue litmus —in other words, being amphioteric. In reality, however, normal milk, owing it was thought to a certain amount of

carbonic acid dissolved in it, ought to be considered as acid. Dr. Wynter Blythe by experiment has shown that milk contains, in a litre of fresh warm milk, 1.83 c. c. of gases—carbon dioxide, .06 c. c, or 3.27 per cent. ; nitrogen, 1.42 c. c. or 77.60 per cent. ; oxygen, 35 c. c. or 19.13 per cent. ; and that standing increases its carbonic acid by a certain amount of oxygen absorbed.

It is questionable, however, whether milk does really contain when freshly milked any appreciable amount of carbonic acid, since by experiments carried on in the laboratory of the provincial board of Ontario it has been found that the acid reaction found in milk just drawn does not alter on boiling, by which process carbonic acid would be driven off if present as a free acid. It has further been found that milk, if rapidly aerated and cooled, does not increase in its acid reaction.

The following results of experiments carried on in a large dairy near Toronto by my laboratory assistant, Mr. J. J. McKenzie, will be found of great interest in determining this point :

The standard normal solution of caustic soda (40 grammes to 1 litre of water) was prepared and added to milk just drawn from the cows into clean sterilized flasks. The point of acidity was delicately determined by pheno-phthalein having been previously added to the milk. It will be seen that the acidity of milk may be represented as having an average of 1.1 in a series of individual milks, or in the mixed milk from a herd of one hundred cows : that is, 1.1 cubic centimetres of normal caustic soda solution was necessary to neutralise the acidity present. As these cows had been fed month after month on fresh cut hay mixed with bran and pea-meal, and on the grass for a few hours each day, it may be said that the food was the best possible for determining what is the normal physiological acidity of milk. From the fact that carbonic acid does not seem to be a factor in this acidity, but that it depends upon some acid basic salts (probably phosphates) present, it will appear that in the determination of the acidity of milk we have a method of much value in not only testing the effects of different foods on milk, but in estimating the changes which go on in milk under the influence of bacterial ferments of various kinds.

At this point I enter upon a part of our subject so interesting and yet so intricate, that I confess to having some fears as to the propriety of my attempting to deal with it ; and yet, I am convinced that until the biological factor in the study of milk has been followed with the same assiduity as has the chemical, we are not likely to greatly increase our present knowledge on the subject.

Starting then with the facts just related regarding the acidity of milk, I believe it will be found that, under ordinary conditions, the determination of the acidity of any milk will serve as a measure of the degree of bacterial infection which has taken place, and of its fitness for use as a food. For instance, in the experiments which I have recently been directing, a milk, which showed 1.1 degrees of acidity both at milking and after aerating and cooling by a method adopted at a large dairy near Toronto, was placed in quart bottles, which had been well washed in a warm soda solution and afterwards rinsed in clean water and drained and aired for some hours, and thereafter placed in a refrigerator having a temperature of 40 to 45 degrees F. These bottles were covered with a flat metal cap and allowed to stand. After five days their acidity was tested, when it was found to have remained unchanged from the normal 1.1 degrees, and the milk, to the taste, seemed in every way normal. Now from this it may fairly be concluded that while the milk must have been infected to some extent with the lactic acid ferment from contact with the sides of the milk pails, cans and bottles, yet the treatment of the milk by aeration, and its subsequent retention at a low temperature, served to delay for the length of time stated the multiplication of the bacillus lacticus, or, indeed, of any other microbe whose multiplication produces an acid reaction.

These facts lead us to enquire whether the care exercised in drawing the milk, in cleansing cans, bottles, etc., may not so minimize the amount of bacterial infection as to make it possible for the defensive proteids, or tox-albumins, which I assume to be present in milk, to so exercise their bactericidal influence as to actually destroy the greater part of the bacilli lactici necessarily introduced.

Fokker has shown that there is in fresh milk some compound present which actually does exert this destructive influence. From an intimate knowledge and observation for several years of the working of a large dairy and of the keeping qualities of milk, I have for some time been of the opinion that what are known as the animal odors of milk exert an important influence, both directly on the wholesomeness of milk and upon its keeping qualities. It is well known that milk, taken from a healthy cow at night and placed warm in a small pail and covered, will retain flavors to a disagreeable extent, and emit an odor, often very disagreeable. It has, hitherto, I believe, not been seriously attempted to isolate these volatile organic compounds, which by aeration and chilling are so readily caused to disappear, although Wynter Blythe in his examination of the gases of milk might naturally have been expected to recognise their presence. He, however, seems to have found only those gases of which a table of amounts has already been given. That they are highly organised nitrogenous compounds I readily believe, and that in themselves they may in some instances be noxious, I have thought possible. For

instance, we are aware that nursing mothers, under extreme nervous excitement of a depressing character, may secrete milk which will cause convulsions in the child; while I have known the milk of a nervous Jersey cow, tethered during the day in a corner of a city park where she was worried by boys and dogs, to secrete a milk which almost invariably was altered between night and morning so as to be totally unfit for use. Such facts remind us of the curious "Gemeingefühl" theory of Jaeger, whereby, under pleasing mental states or the opposite, volatile odors are produced in the body, in the one case, stimulating the heart to full vigorous pulsations; and in the other, depressing notably the heart's action, and so affecting nutrition.

Whatever be the cause of the conditions to which we refer, we learn from those engaged professionally in dairying that there are many variations in the minor constituents of milk, which seem to notably affect its coagulation, etc. Thus, this albuminous substance seems to vary, notably in amount, according to the age of the milk, and doubtless according to the healthy character of the mucous membrane of the udder and teats.

After making all allowance for these minor variations in the constitution of milk as affecting its wholesomeness as a food, it must be confessed, however, that the care of the milk, in its handling from the time of taking it from the cow until it is consumed, is by far the most important element in the question of its fitness for food. Milk taken under the best ordinary care in stables is by no means as free from bacteria as it might be; but as too commonly taken, it is absolutely laden.

The following is the result of a bacterial analysis of milk, taken by my laboratory assistant, in a large stable, where the milk is supposed to be handled with unusual care as regards cleanliness: Gelatine plate cultures were poured, one half c. c. of milk being added for each culture. After three days, maintained at the laboratory temperature of 65-70 degrees F., the various plates giving the following results:

ANALYSIS OF MILK (BACTERIOLOGICAL) AT DIFFERENT STAGES OF TREATMENT.

Average of two samples.

I. Direct from cow; no precautions except milk received into sterilized test tube, 15 microbes per c. c.

II. Pail in stable receiving milk from different cows; milk strained through a cloth, 720 per c. c.

III. Milk from cooling apparatus after cooling, 884 per c. c.

IV. Milk from bottles immediately after filling, 1,640 per c. c.

As regards normal milk acidity:

Oct. 7. Six cows gave the following: .95, 1.06, 1.27, 1.12, 1.20, 1.09—average, 1.11. Kept in all day: 1.11 c. c. of normal soda required to neutralize. Average of mixed milk of 100 cows on cooling, 1.11.

Oct. 8. Cow No. 2 of above series, 1.10; No. 3 (back lamed), 1.50; No 4, 1.00; No. 5, 1.01. Out all day pleasant days. Mixed milk, 1.10. After standing in refrigerator, for four days at 40-45 degrees F., 1.10, 1.50, 1.00, 1.00—average 1.11. All milk aerated, but not otherwise sterilized.

These results are remarkable, and illustrate Bitter's (of Breslau) conlusions that air contamination is the merest incident as compared with that due to the hands of milkers, strainers, and other various utensils used. It is not then difficult to understand how, with a slow process of cooling from 100 degrees F. down to air temperature, very favorable conditions have been present for the multiplication of germs.

It is curious to note how many explanations other than the bacteriological one are given for milk changes by professors of dairying. Professor Arnold illustrated in his work a peculiarity, which, during the warm weather of a particular summer, occurred in Rochester milk, by which, after the driving of milk in wagons a few miles from the country, it was found to be coagulated while showing no marked acid reaction. This is now known to be due to certain bacterial forms different from the common acid producing forms.

Speaking of the bacteria of milk, much good work has been recently done on the subject, and some very interesting results have been obtained. Of these, those carried out by H. W. Conn, Ph. D., at the Storrs experiment station, Connecticut, are of much interest. He has, as might be expected, found almost innumerable bacterial forms in milk; but there are principally three classes, distinguished by the effects of their action on the milk. These are, briefly,—(1) The bacillus *acidi lactici*, and perhaps allied forms which change the sugar into lactic acid and carbonic acid, and coagulate caseine into a hard mass, are aerobic, and do not liquify gelatine. (2)

The second class curdle the milk without rendering it acid. These forms iquify gelatine, produce spores, and are anaerobic largely. The curd formed by these is soft and jelly-like. (3) A third class, as *oidium lacticum*, seem to be common in milk, and yet produce no marked coagulative effects or acid reactions.

That, however, the various decomposition changes which occur in milk, cheese, etc., are due to bacterial action, may be realised from the fact that milks kept under various conditions have shown bacteria ranging in numbers from 300 to 6,000,000 per c. c. How they may multiply is seen by the single illustration that milk which had been kept for several days in a cool place and then showed 10,000 bacteria per c c. was afterwards allowed to stand in a warm room some six hours, and during this time the bacteria increased from 10,000 to 1,000,000 per c. c.

Now I have intimated enough to fully set forth the fact that milk sterile on milking becomes at once contaminated under ordinary circumstances ; but that the rapid development of sourness really depends upon the subsequent conditions.

Fokker, of Groningen (Holland), has given figures showing that for a short time milk seems to resist bacterial growth. For instance, he added a measure of bacterial broth to milk, and found that—

1 c. c. of milk then contained 120 bacteria ;
1 c. c. of milk contained after 24 hours 10 bacteria ;
1 c. c. " " " 48 " 2,200 bacteria :
1 c. c. " " " 72 " innumerable bacteria.

He further indicated, what Duclaux and others had pointed out, that the resisting power of milk is lessened by sterilization, since, if subsequently inoculated, he found it invariably coagulated in twenty-four hours.

But aside from all these special conditions there stand out the broad facts, within common experience, that good milk taken carefully does form under ordinary conditions, an admirable culture medium for various bacteria, but especially for the common sour milk *bacillus lacticus*. I give but one of our experiments : Four sterilized tubes were filled with milk and plugged with wool ; two lots being directly from the teats of the cows after careful washing, and two from the mixed milk after aeration and cooling. All were exposed to the laboratory temperature, and at the end of thirty hours all were coagulated, and showed practically the same degree of acidity measured by the normal alkaline solution.

From the results of the plate cultures already given, we have seen that the milk at these two stages showed a very notable difference in the number of bacteria present : yet in practice this amounted to very little, so long as any inoculation at all had taken place and the temperature was favorable for rapid bacterial growth. On the other hand, as might be supposed, there are degrees of purity as regards bacterial contamination ; and a milk, if carefully taken, is much more likely to remain sweet if kept cool than if much contaminated.

Bitter has found that milk in sterilized and unsterilized cans varies greatly in keeping properties after Pasteurization. Thus :

Sterilized cans.	Unsterilized cans.	Temperature.
46 hours.	24 hours.	23 degrees C.
96 "	48 "	15 "
72 "	24 "	23 "
130 "	65 "	14 "
86 "	48 "	19 "
104 "	66 "	14 "

But that temperature is the main factor, has similarly been shown by Bitter in his experiments with Pasteurized milk. Thus when heated to 68 degrees C and thereafter chilled, the following results were obtained :

At 30° C. milk remained good 6-8 hrs. longer than un-Pasteurized milk
" 25° " " " 10' " " " "
" 23° " " " 20' " " " "
" 14°-16° " " " 50' 70' " " " "

Bitter has determined after numerous experiments to make an arbitrary standard of goodness of milk by counting the number of bacteria in the sample Milk, according to this scale, is good if the number of bacteria falls under 50,000 per. c c. Above this it becomes doubtfully good, and when 2,000,000 per c. c. are present it is absolutely destroyed. He concludes

that, with regard to the preservation of milk, Pasteurization at 68 to 75 degrees C. is safe at ordinary temperatures; that in hot summer weather it will keep at least thirty hours longer; and that at this temperature the taste and flavor are not altered and cream production is not affected.

Manifestly, however, with ordinary methods, as we find them, in the care of milk, temperature, of all factors, has the most important bearing on the keeping of milk. I cannot do better than conclude these studies with a quotation from a recent critique, by M. Duclaux, "Sur la sterilisation du lait." He says:

"It seems to me that in place of always marching forward in this direction, it would be useful to retrace our steps, and ask ourselves if it would not serve better if we should avoid all necessity for heating, in preventing absolutely the introduction of all hurtful germs into the milk. In the conference, held on the 7th of June, 1889, in the Trocadero, during the Universal Exposition, I said, 'that milk, properly taken in a stable properly kept, by a milker who had first washed his hands and the teats of the cow, would not coagulate more quickly than milk taken without care, and having carbonate of soda added to it to mask the defects of cleanliness.' * * * 'It seems to me that in this direction lies progress, at least for milks destined for rapid consumption, and not from the side of the multiplication, or making perfect, of apparatus for Pasteurization.'"

Summing up, then, some of the practical conclusions to be derived from our studies, I would briefly formulate the following, as methods likely to conduce to an improvement in our public milk supplies.

1. After intelligent dairymen have selected their cows, it is especially desirable that a system of periodic veterinary inspection, in addition to the dairymen's inspection be exercised, under the municipal health department, of all milch cows supplying milk to the municipality.

2. From what has already been said it is manifest that strong views should be held and taught regarding the nature and quality of the food of milch cows, whose milk is intended for public supplies. Not only has it a direct influence on the general health of the cow, but the condition of the milk at the time of taking, and also its keeping qualities, are undoubtedly in no small degree dependent on the character of the food supply. All decomposed foods, as those which are liable to undergo fermentation, should be wholly avoided. As already mentioned, the best foods are the well ripened grains and grasses, well cured and free from weeds, fed in such a manner as to supply the various milk constituents in proper amounts, and in such a way as to promote easy digestion and proper assimilation.

3. The stables of the cows are manifestly a point of great importance. Too often, dark, damp, ill-ventilated, and crowded pens have been the home of this chief of our food supplies. It is quite possible, as hundreds of dairymen and farmers have shown on this continent as on the old, to keep, even on a large scale, a dairy stable free from the ordinary disagreeable stable odours, to give the cows abundant ventilation, and to so conduct the feeding, that cows, taken from the ordinary barn-yard feeding of the farmers, will readily improve in general appearance and increase greatly in milk and in flesh. The water supply to the cows is of equal importance. Too often, the barn-yard pool, or sewage-tainted creek, or cheese factory drainage, are the sources from which the dairy cattle drink; and not even to mention the more delicate physiological effects of such water, cheese makers tell us that they can distinctly note the gross effects of cows drinking filthy waters by the degraded quality of the milk which at times, comes to their factories.

4. The care of the milk at the time of, and subsequent to, taking, is, however, of all points at once the most difficult of control and the most necessary to supplying a wholesome milk. We have pointed out wherein the difficulties lie, and would only say, as Duclaux has said, "Cleanliness everywhere is the *sine qua non*." That it means almost a revolution amongst farmers and dairymen, as regards their methods, is apparent; but as Duclaux neatly says, "Producers will quickly find the means (of cleanliness and a reform in their methods) if consumers wish strongly. When people demand clean milk, they will have it. They will always have to boil milk before using, when they are not sure of the condition of the cow that furnished it, but the question will not the less have taken a great step in advance when milkmen and milk-maids know all that is implied in cleanliness." Hence, the sterilizing of the cow's teats by washing, the sterilizing of all cans and bottles by steam or dry heat, and the boiling of all cloth strainers will be necessary. Aeration and rapid cooling are of enormous influence in delaying, as we have seen, the multiplication of bacteria, and I am convinced that the placing of milk in a refrigerator over night, at 40-45 degrees F., and allowing the cream to rise in well stoppered bottles, conduce together to the greatly increased permanency of the normal milk condition.

5. The delivery of the milk is similarly of prime importance. If placed to cool in sterilized bottles, at a low temperature, the layer of cream tends to prevent agitation in the bottles, and where the bottles are packed at the same time in accurately fitting compartment boxes, these

exactly fitting into wagons specially designed for them, the agitation or disturbance of the milk in transit will be reduced to a minimum, and the introduction of oxygen be lessened. The numerous details in this regard need not be further referred to here.

6. Finally, when the milk has reached the consumer, it must be placed in a refrigerator, or promptly consumed. If in the former, I have known milk in summer weather to retain its sweetness for three or four days when precautions such as I have spoken of are present.

7. In case the Pasteurization of milk is introduced into practice by dairymen, it is necessary that the same care should be exercised in keeping milk cool, after heating to 68 or 70 degrees F., as is necessary under ordinary treatment.

In conclusion, I may say that it is my opinion, after very carefully studying the processes and results of a large dairy for four years, that, with carefully selected and inspected cows, as regards freedom from disease, notably tuberculosis, the taking of milk with care as to cleanliness in the particulars already given, to aerating the milk to remove the volatile animal gases, to bottling in sterilized and well stoppered bottles, and the placing them promptly thereafter in cold storage, at 40-45 degrees F., with careful handling in delivery, will be found to present so many practical advantages, both as regards the tastes of the consumer and the convenience of the dairymen, that sterilization in other respects will not be likely to be found necessary, or find general adoption.

P. H. Bryce.

CHAIRMAN'S ANNUAL ADDRESS.

BY J. J. CASSIDY, M.D., TORONTO.

To the Members of the Provincial Board of Health of Ontario :

GENTLEMEN,—It is scarcely necessary to say that Medical Health Officers throughout the Province regard the enforcement of clause 80 of the Public Health Act, which provides for the compulsory reporting of infectious diseases, as of the very first importance. It is pleasant to note also that the physicians on whom the duty falls of reporting these diseases, have, with few exceptions, fulfilled the requirements of the law. Compulsory notification of contagious diseases, advancing with the growth of sanitary administration in different countries, became law in Germany by a series of successive regulations of the different States from 1835 to 1880, in Hungary by the sanitary law of 1876, in Denmark since 1875, in Holland since 1872, in Italy by one general sanitary law of 1874, in Portugal since 1868, in Servia by the law of 1881, in Sweden since 1874, in Norway since 1860, in the United States, by different special Acts for the several States from 1872 to 1880, in Canada, by special Acts in some of the Provinces, since 1884. In England also a recent Act (August 30th, 1889,) provides for dual notification, *i.e.*, by the head of the family to which the patient belongs, and also by the attending physician. In this Act the expression "infectious diseases" in the meaning of the Act comprises the following diseases :—smallpox, cholera, diphtheria, membranous croup, erysipelas, scarlet fever, typhus, enteric, relapsing, continued, and puerperal fever.

In France also, where the initiative in this question of notification by the physician was begun in 1822, it is contemplated to introduce a law which will be of the same character as the enactments passed in other countries.

In enforcing this wise provision of our law difficulty occasionally arises owing to the fact that physicians resent the appearance of health inspectors in houses where they are attending cases of infectious disease. Looked at from the broad platform of the public good, and supposing that both parties are sensible men, we fail to see why any difficulty should occur between the Medical Health Officer and the attending physician. The former aims at removing from the household all possible and probable sources of infectious disease ; the latter directs his energies to the treatment of patients poisoned with these same diseases, in many instances, alas, too profoundly to be rescued from death by even the best judgment or most highly trained ability.

Ever since the formation of this Board evidence has been accumulating from every county of the Province showing the close connection between impure water and typhoid fever ; that cholera does not occasionally prevail amongst us is simply owing to the fact that the seeds of that disease are not regularly added to the water as they are in China and India. As a writer in the *Sanitary Era* of New York says :—"Of the two great foul-water plagues, typhoid fever and Asiatic cholera, the former is endemic and nearly continual in its ravages ; while the latter is more limited as to places and seasons, but more concentrated and terrific in its onsets." Port Arthur, a city in northern China, which previously lost a large part of its residents each year through cholera, typhoid fever and other enteric diseases, is now comparatively free from epidemic diseases. This is solely due to the energetic measures taken by the French years ago in building a system of water-works and thoroughly cleansing the Chinese part of the city. *Mutatis mutandis*, what is here narrated of a Chinese town would apply equally (cholera being omitted) to some towns in Ontario where the ravages of typhoid fever are known to be considerable.

In view of the law, see section 30 of the Public Health Act, that plans relating to proposed water supplies should be submitted before their adoption to this Board, municipalities in Ontario should govern themselves accordingly, otherwise they may put themselves in the position of the municipality of Parry Sound, where a by-law providing for the erection of water-works has been illegally submitted to the people, the plans not having been previously sent to this Board.

In the matter of ice supplies the Toronto Board of Health has recently taken the position that the dirty ice of Toronto Bay can be safely used for cooling purposes by brewers and butchers. If the foul stuff is simply allowed to melt and return by the sewers to its native element no harm can result, but if it should find its way into the stomachs of the people the results will certainly be disastrous. We are glad to see that Dr. Allan was opposed to this concession.

In the matter of milk supplies it is very important that parents should know, as we have already stated, that milk, the common food of the nursery, is a culture medium of the diphtheritic germ. The germ of typhoid fever might also be introduced if impure water were used in washing cans, bottles, etc. The utmost pains should, therefore, be taken by the public to obtain milk from dairies where perfect cleanliness is known to be the rule. When the source of the milk is unknown the safest plan is to subject it to the prolonged action of heat near the boiling point, which destroys all the pathogenic germs.

Although many papers have been and are regularly read at sanitary conventions and similar meetings on the ventilation of public buildings and private dwellings, improvements in the matter of ventilation are few and far between. Windows should be opened in mild weather for at least part of the day, and if raised at the bottom one inch and lowered at the top an equal amount excellent ventilation can be secured with little danger of draught. The method suggested by Dr. Cotting of raising the lower sash a few inches, and inserting beneath it a board the width of the window, secures a considerable ventilating space between the two sashes at their point of junction. Dr. Roseburgh, of this city, has patented an ingenious plan of window ventilation, which can be applied at a small expense. As an addition to practical hygiene we may also mention the perforated window panes so much extolled by Mr. Emile Trelat. As the learned professor says :—"Fresh air ought to be regularly introduced in a permanent manner into all inhabited rooms ; hence the sashes ought to be furnished with perforated panes of glass. Panes of glass intended to allow a constant inward flow of the outer air in an imperceptible fashion are perforated with from 2,000 to 3,000 holes to each square metre. The holes widen out towards the inside in order to flush the fluid veins at their entry into the chamber. These panes ought to be used only in rooms having a minimum elevation of eight feet, and they are principally intended for cabinets, closets, etc.

The following letter, which was recently received at this office, goes to show that the people referred to do not seem to take to ventilation very heartily, or that their experience of it must have been accompanied by some alarming details :—

Dear Sir,—To point the need of unrelaxed effort to educate or compel people to ventilate public buildings, I quote the following resolution adopted at our annual school meeting on the 30th ult.:—"Moved and seconded, that a vote be taken by those present how they feel on ventilating the school-house. Twenty-eight against it, and one for it."

J. Dearness,

Inspector of Schools.

Our correspondent does not indicate what was the objection to ventilating the school. It could scarcely have been a dislike to pure, warm air in the school-house. Most probably it was a rooted objection to paying any more bills in these hard times. If this is true, while we sympathise with the economy of our western friends, we would prefer to see it exhibited in a more commendable fashion than in depriving the rising generation of a full supply of the breath of life.

It has been my good fortune, in previous years, to have been present at the annual meetings of the Association of Executive Health Officers of Ontario, and my recollections of the papers read and the discussions held convince me that the Ontario sanitarian is doing his work faithfully and well. The report of the meeting held in Trenton last August is full of instructive and well-written papers, with the individuality of their authors stamped on them, so much so indeed that in fancy's eye I could when reading almost imagine that I was gazing on the scene. Long may such good work continue to

be done, and as each recurring year brings us together, may the bonds of mental similarity and congenial feelings, with the impetus derived from a noble cause, help to make our meetings felicitous in the solution of old problems and fertile in the introduction of new ideas.

Apropos of the latter, it has occurred to me that it would be well if our Provincial University would provide instruction, training, examination, and a diploma for graduates in medicine who wish to become medical health officers. Durham University in England provides a two years' course in hygiene with examination and a diploma as doctor of hygiene. A similar degree is granted at Cambridge. Toronto University might well consider the advisability of establishing a faculty of the kind, which would be certain to receive support not only from the provinces of the Dominion, but also from the United States.

PART III.

REPORT OF LOCAL BOARDS OF HEALTH.

CITIES.

Belleville.

Medical Health Officer's Report.

I had the usual order issued for the cleaning of yards and premises in the spring which was responded to very well by the citizens generally. I ordered the Inspector to make a house to house inspection of the city, and report to me. When required, I issued orders to abate any nuisance found.

The number of privy pits cleaned and disinfected, 576 ; number changed to dry earth closets, 73 ; number closed, being too near dwellings, 6 ; number of hog pens removed and disinfected, 14. I may say that hog-pens have caused the Inspector a great deal of trouble, owing to the difficulty of keeping such places clean and free from smell.

Number of wells filled up, 7 ; all public wells were thoroughly cleaned out. Number of cesspools cleaned, 5 ; number of cesspools filled in, 2.

The dry earth closets were cleaned monthly, and all refuse matter from yards carted out of the city. The Inspector and myself made frequent inspections of the slaughter houses and premises, and saw that they were kept in a thorough sanitary state.

The city has been very healthy during the past year, and the mortality much lower than any year during my time as Health Officer. The deaths for 1885 being 191 ; 1886, 175 ; 1887, 216 ; 1888, 167 ; 1889, 164 ; 1890, 193 ; eleven months 1891, 118.

No deaths were reported to me from either scarlet fever or measles. One death from diphtheria; the source of contagion in this case being brought from Toronto by parties who lost a child there. Two deaths from typhoid fever during the year ; four deaths from membranous or diphtheritic croup.

The city's greatest want now is a proper system of drainage, which I trust will soon be an accomplished fact. I am very much pleased to be able to report that a thorough system of sewerage is being placed in the Institute for Deaf and Dumb, and, that soon, all danger of the sewage from that place, affecting our water supply from the bay, will be removed. I cannot close this report without giving credit to the Inspector for the energetic manner in which he performs his duties.

R. TRACEY, M. D,,
Medical Health Officer.

Brantford.

Medical Health Officer's Report.

Mortuary Statistics.—The number of deaths occurring in the city during the year was 168. This gives a death rate of only 11.75 per thousand in a population of 14,280. The number of deaths is much less, and the death rate is much lower than they were in any since the organization of this board, seven years ago.

The causes of death, from the principal preventable diseases, were as follows, with comparisons with several previous years :—

	1891.	1890.	1889.	1888.	1887
Typhoid fever	6	11	9	13	8
Diphtheria	5	6	13	10	19
Scarlet fever	1	0	1	0	2
Measles	0	1	1	1	0
Whooping cough	1	1	4	5	7
Cholera infantum	20	10	18	26	33
Consumption	2	22	18	17	21

The mortality in typhoid fever has varied from nine to twelve per cent. of the cases reported or known. Thus there were sixty-four cases this year, and six deaths; last year eighty-eight cases and eleven deaths; in 1889, ninety-six cases and nine deaths; in 1888, 117 cases and thirteen deaths; and in 1887, 112 cases and eight deaths.

Typhoid Fever and Impure Water.—Careful enquiry concerning all the cases of fever this year, shows that sixty-three out of the sixty-four victims were drinkers of unboiled well-water. In some of the cases the water was said to appear "very good;" in many cases, "not very good;" and in several cases, "very bad."

It is established beyond any doubt that the most potent factor in the causation of typhoid fever, is, impure drinking water, especially that exposed in any way to contamination by human excretions.

Fever in Eastern Cities.—It is a surprising fact, which has often been commented on, that many great eastern cities, such, for example, as Tokio and Canton, where water supplies are very impure, whose general sanitary condition is extremely bad, and where death rate is very high, have, nevertheless, a comparative immunity from typhoid fever. The explanation of this remarkable fact is to be found in two other facts. The first fact is that their water supplies, however filthy, are not often contaminated by human excretions; such excretions being speedily conveyed to the country and converted into fertilizers. The second fact is that, good or bad, they don't drink the water. In other words, the use of raw or unboiled water in those cities is practically unknown, the prevailing drink being tea.

Examples from American Cities.—The relation of contaminated water to typhoid fever is well seen in the mortuary reports of American cities, for the last twelve months. Take for example Brooklyn and Chicago. Brooklyn has a good water supply, and has a typhoid death rate of only seventeen per 100,000, while Chicago, which gets its supply of water from the same reservoir into which it discharges its sewage, has had the fearful rate of 152 to the 100,000. If you look at Toronto, into whose water conduit bay sewage has been leaking, you will have a typhoid rate this year exceeding fifty, which, although only one-third that of Chicago, is three times that of Brooklyn. Brantford, which has depended thus far mainly on well-water, generally impure, has a rate this year of forty-one; the rate for the four previous years having varied from sixty to ninety. It is interesting to notice that the total general death rate of the four cities named, was as follows :—Brooklyn, 25.28; Chicago, 23.65; Toronto, 15.60; and Brantford, 11.75 per 1,000.

Brantford a Healthy City.—It is very satisfactory to report such a very low, general death rate for Brantford: it is also satisfactory to know that the amount of diphtheria, scarlet fever, etc., has been small, much less than for many years past, because it thus appears that the general sanitary condition must be good, and that Brantford is a very healthy city. It is not so satisfactory, however, to know that a purely preventable disease like typhoid fever, should continue unduly prevalent, and I have in this report referred to this matter more particularly because I feel it is not necessary that this should be so.

Typhoid Fever Should be Stamped out.—There is no reason why this disease should not be practically abolished, stamped out, in this city; and if the people choose to avail themselves of the means now within their reach, an excellent water supply and drainage system, and wholly abandon drinking water from wells whose only source of supply is the city rainfall, imperfectly filtered through a polluted soil, this disease will practically cease

to exist in Brantford. There must also result from the adoption of these means, a diminution of the amount of general sickness, and a substantial improvement in the public health. In the experience of Brantford for many years, the lower the water in the wells the greater has been the amount of fever. The reason is that the less water there is in them, the filthier it is; the contaminating sewage being the less diluted. Thus, where sewers have lately been constructed, many wells have been more or less dried up, the ground water which supplied them running off in the drains. Some of these wells, which formerly gave a large supply of apparently good water, now give a small supply of obviously impure water. These facts explain the undue proportion of fever on the high and dry plateau in the East ward. Entirely surrounded by low land, its well water is wholly derived from the rain which falls in the immediate locality, and is not increased and diluted, as in most other localities, by supplies from a larger radius; it is therefore especially liable to a high degree of contamination.

Water in West Brantford.—In West Brantford the public water supply is not available in winter. This defect should be speedily remedied, either by protecting the pipe crossing the bridge from frost, or otherwise by carrying it under the river. It is a serious matter that the residents there, who may desire to put in the city water, should be debarred from so doing.

Testing Water.—Some new and excellent methods of examining water have lately been devised by Mr. McGill, assistant Dominion analyst, which were highly approved by the Health Officers' Association, and by the Provincial Board of Health. I had the opportunity at the meeting in Trenton, in August last, of practically working out these methods by assisting Mr. McGill in examining a large number of samples from Trenton wells. We have recently obtained for our office the apparatus required for this work, and will be able hereafter to demonstrate the qualities of any samples of water with exactness and certainty.

Diphtheria, Scarlet Fever and Measles.—There were thirty-two cases of diphtheria reported during the year, of which five were fatal; and there were twenty-one cases of scarlet fever, only one having been fatal.

The system of notification in regard to these diseases, and prolonged exclusion from school even in the mildest cases, has been well carried out, and has apparently been successful in preventing their spread where they have occurred.

In regard to measles, the regulations are not enforced with the same stringency because the epidemic which prevailed in the spring, though very wide-spread, was exceedingly mild. Two hundred and twenty-six cases were reported, but there were no deaths. Children from affected families were, however, excluded from school for brief periods. The crowded and ill-ventilated condition of the temporary school-rooms then in use, were, I think, largely responsible for the great diffusion of this epidemic.

Two hundred and ninety-six notices regarding contagious diseases, were sent to the various schools, and 147 to the free library during the year.

The Public Schools.—I have personally inspected all the schools: the Central Ward and Separate schools and Collegiate Institute, not only with regard to the measures used to prevent the spread of contagious diseases, but also in regard to ventilation, heating, lighting, water, cleanliness, etc., all of which are so important in relation to the present and future health of the children.

So far as the Central school and Collegiate Institute are concerned, there is not much left to be desired in any of these matters. In the ward schools some improvements are rather urgently required.

Milk Supply.—The milk supply of Brantford for the past year was derived from twenty-three dairies, having 412 cows. Samples from nearly all the dairies have been inspected four times, or once in each quarter, and all the dairies, and all the cattle, have been inspected twice. Over 2,400 quarts have been delivered daily, and the whole cost of the milk supply of Brantford during the year, was about $44,000.

The average strength of the milk in butter fat was 3.60 per cent.; in the years 1888-9

the average strength was 3.20 ; the gain amounts to 12½ per cent. A substantial annual gain to the city, in the matter of its milk supply of about $4,000, may therefore fairly be ascribed to the operation of the Public Health Act.

Knowing as we do that the value of milk may be reduced by the addition of water, by the removal of cream, or keeping back of strippings, and also by improper feeding ; knowing that it may be, and often is, a fertile source of cholera infantum and similar affections, that it has frequently caused fatal epidemics of typhoid fever, scarlet fever and diphtheria, and that the milk of tuberculous cows may transmit consumption, and finally, that with regard to no other article of human diet, is it so different for the public to protect itself, the necessity for frequent inspections and examinations is manifest.

Sanitary Inspection.—The books of Inspector Adams show that 1,285 inspections of premises were made during the year, as compared with 784 in 1890, the details of all of which are recorded. The four small slaughter-houses within the city were frequently inspected, and they have been kept with great care. Two slaughter-houses in the annexed district, which were in a bad condition, have been discontinued. Four hundred and seven complaints of nuisances were made, all of which were investigated.

Samples of water from seventy-three wells complained of, were examined. Thirty of these were so bad that they were filled up by authority of this board. A number of others were voluntarily filled up by the owners.

City Contractor.—The number of pits and cess-pools emptied during the year was 485, of which 330 were by the order of the inspector. Of these, eighty-one were filled on the inspector s order, in conformity with resolution heretofore passed by the board, and twenty-two were voluntarily abolished. No new pits have been dug during the year. The dry earth closet service book shows shows 1,408 closets, for nearly all of which there is a monthly service. It is estimated that there are about 200 others not in the contractor's books. The whole of the service, I am glad to report, is now working satisfactorily, no complaints of any kind, either as to the service or as to dumping, having been made for a long period. In view of the difficulties with which many other cities are almost hoplessly contending in this respect, we have good reason to be well satisfied.

Owing to the limits of this report, I defer to another meeting, reference to a number of important matters.

I have alluded in this report to the waterworks and drainage system of Brantford, works which the city has undertaken within the last few years, and is now carrying towards completion. The importance of these works in their sanitary relations is not questioned, but there are those who think that much of the drainage work is premature, and will be unduly burdensome. I am confident that the results will soon establish the contrary.

It was understood at the outset that the introduction of a public water supply must be at once followed by a drainage system, otherwise the city would become damp, sodden and filthy, from the great increase of liquid refuse infiltrating the soil. Such a drainage system, of the most ample and perfect kind, is being constructed, and these systems must be taken together. They are sure to prove the best investment, from a purely financial point of view, the city ever made. At the rate at which the city water is now being put in, the profits arising from the city owning the works itself, will very soon suffice to provide for all the obligations incurred by both waterworks and sewerage.

Water rates will, of course, have to be paid, but they need not exceed the cost of maintaining wells and cisterns.

If Brantford has to contend with any difficulties or dangers in the future, they will not be due to these works ; on the contrary, it is certain that the possession of such most desirable and most excellent equipment will strengthen our position and render our future more assured.

E. GRIFFIN, M. D.,
Medical Health Officer.

GUELPH.

Medical Health Officer's Report.

I have the honor to submit my annual report of the state of health of the city, dating from 1st November, 1890, to the same date 1891. During the year 154 deaths have occurred, being at the rate of 14.61 for 1,000 inhabitants, based on a population of 10,537 according to the last census. One hundred and twenty three cases of contagious diseases have been reported, namely:—five cases of typhoid fever with one death; ten cases of scarlet fever without any death; 108 cases of diphtheria, of which twenty-eight cases have proved fatal.

During the month of July the city was visited with an epidemic of this disease, which has proved very fatal. It has also been prevalent in the neighboring townships, villages and towns; indeed, cases of the disease existed in the country some months before it appeared in the city, no less than twenty-five cases from a distance having been treated in the General Hospital since last January. While in some cases the disease could be fairly traced to a filthy and insanitary condition of the houses or premises, in others to the drinking of water from polluted wells, the majority of cases of the disease broke out in houses which were cleanly kept and their surroundings in fair condition. Now, while I hold that in all epidemics of diphtheria there is some condition of the atmosphere which predisposes persons to contract the disease, I still firmly believe that for its continuance and multiplication there must be food for it to live upon and generate in. This pabulum is furnished by foul air, polluted water and filth of every kind, in a state of decay. This city has a loose, gravelly subsoil through which fluids easily and quickly permeate to a long distance. It is being more closely built up every year, the number of privy pits and cesspools is constantly increasing, the drainage from which is steadily polluting the soil. When a heavy rainfall occurs, the water quickly permeates through the loose soil, carrying with it a quantity of poisonous material which finds its way into wells, cellars and low-lying places. When great heat follows there is rapid evaporation, and the air is poisoned by the emanations from the polluted soil. This condition of affairs must continue until a proper system of drainage is adopted, and I would urgently press upon the members of the City Council the great necessity of making provision for a proper and efficient system of sewerage as soon as possible.

A proper organized plan for the removal of all garbage is also an urgent need.

The very small number of cases of typhoid fever that have occurred during the past three years is a subject of congratulation, particularly as it proves the good condition of our water supply, this disease in the majority of cases being due to impure water.

I regret to have to state that our percentage of deaths this year exceeds that of last by a little over one in one thousand of population, but a larger number of deaths have been of those well advanced in years, no less than thirty-one having occurred between the ages of sixty-five and ninety-one, viz: Three between 65 and 70, eight between 70 and 75, ten between 75 and 80, nine between 80 and 85, one at 91, one at 109. Then 37 deaths occurred at or under 12 months, eight of these being still born children, and even with the unusual number of deaths from diphtheria our rate compares very favorably with past years and with that of other cities, being in 1886 it was 18.1; 1887, 15.14; in 1888, 18.05; in 1889, 13.09; in 1890, 13.49. In the annual report of the Provincial Board of Health for 1890 the ratio per 1,000 of population is given. Ottawa, 21.54; Hamilton, 19.24; Toronto, 16.39; Brockville, 17.88; Brantford, 14.36; Guelph, 13.49. In Hamilton the rate is based upon a population nearly 5,000 less than the last census which would decrease its rate to 17.67, while in Brantford it is based on a population over 500 greater than the last census returns, which would increase the rate to 14.92, while in Guelph the last census gives a slightly larger population than our rate is based on.

T. AUCHMUTY KEATING, M. D.,
Medical Health Officer.

Hamilton.

Medical Health Officer's Report.

The total number of cases of scarlatina, diphtheria and typhoid fever was 208, with eighteen deaths therefrom, being 106 cases less than in 1890, also less by only two deaths. There were thirty cases of measles reported, with one death, there were also a few cases of whooping-cough, mumps, and chicken-pox. The death rate is the lowest yet of any fiscal year; it is 14.48 per thousand of the population, placing the latter at 47,000. We can, therefore, congratulate the city with having a small death-rate, with fewer contagious diseases.

While on the subject of deaths and contagious diseases I take the opportunity of saying that it is the custom in most well regulated cities to require that a permit shall be had from the health officer before a body is allowed to be removed for burial. Such a rule has not only a medical, but also a legal significance, and I would recommend its adoption in Hamilton. It would prevent the spreading of contagious diseases, particularly so when bodies were removed to distant burial grounds. Such cases occur occasionally in Hamilton, Toronto and probably in other localities, all of which should mutually protect each other; it would also insure getting in the full complement of deaths in time, and and thereby assist your registrar of deaths; it would also cause accuracy in the registration of the causes of deaths registered in the cemeteries, which is not always well attended to; it would also aid justice in cases of death from suspicious causes, giving full time for investigation before burial, rendering the exhuming of bodies less liable to be required. The duty should devolve on the undertakers, for which they might be allowed to charge a small fee for their trouble. The disposal of garbage was fully discussed at the annual meeting of the American Public Health Association held last month in Kansas, and the consensus of opinion was that the disposal of refuse should be completely under the control of health officers. That idea was carried into effect in Hamilton when the scavenger system adopted by the local board of health was first introduced. It has worked well since, and any alteration made will be a retrograde one. Garbage is rotten stuff to use for patronage, and requires discrimination in its disposal. When we find that in a large and populous city like Chicago all garbage is dumped a few miles out into the lake, with the possible danger of contaminating the water supply, and that in other cities all refuse is destroyed in crematories, which do not appear to work with satisfaction, we may well rest content that our method of the disposal of garbage and ashes is the best, cheapest and most useful that we can adopt, although it may not have reached the high standard of perfection so difficult to ascertain.

I desire to call your attention to the difficulty which we frequently find in procuring proper sewer facilities, owing to the fact that unless three-fourths of the ratepayers residing on a street petition for a sewer the remainder must do without it. This rule not only obstructs proper sanitation, but in some cases delays the erection of a better class of dwellings, and consequently the loss of valuable property to the city.

There were 1,073 samples of milk examined, also special samples not enumerated; 147 were under three per cent. of butter-fat, 183 reached three per cent., 340 were over three per cent. and under 3.50, 166 were accorded 3.50 per cent., and 237 were over 3.50 in various degrees up to four per cent. and over. This shows 670 samples below the lowest standard of 3.50. Imperfect as our analysis may seem to be it has been the means of discovering diseased milk, sold as one cow's milk for young children, and shows the necessity which exists for the frequent inspection of milch cows and cow byres throughout the Province by thoroughly competent and reliable inspectors.

I. RYALL, M. D.,
Medical Health Officer.

KINGSTON.

Medical Health Officer's Report.

The public are slowly beginning to realize that "Cleanliness is next to godliness," that to prevent disease is better than to cure; that it is more economical to keep clean premises than to pay bills contracted through sickness brought on by removable causes, still there is room for improvement along these lines.

If the people would wake up to the necessities of the hour, and present a determined opposition to every kind of filth about the premises they occupy, contagious diseases would find very little foothold. The price we have to pay for liberty from this scourge is "eternal vigilance" on the part of all.

Contagious Diseases.—During the year we have had contagious diseases in our midst, the cause for which we may attribute, in a measure, to the large number of privy pits in use, which are hotbeds for disease germs; foul wells, the water from which has, upon analysis, been found to be polluted, and in nearly every case dangerous to health; to defective plumbing and stone drains that have become so foul as to be unfit for use. So long as this state of things exists we may expect to have to battle with this "fell destroyer."

The following are the number of cases of contagious diseases reported during the year:—

Month.	Typhoid.	Diphtheria.	Scarlet Fever.	Measles.	Total.
January		2	8		10
February	2	3	3		8
March	6		3		9
April	51	1	3		55
May	13	2	4	3	22
June	9	1			10
July	7	3	6		16
August	6	2	2	4	14
September	5	5	1		11
October	6	1	19	1	27
November	6	10	18	4	38
December	13	9	4	2	28
Totals	124	39	71	14	248

Total number of deaths from contagious diseases:—

Typhoid	9
Diphtheria	9
Scarlet Fever	3
Total	21

Wells.—During the year there were thirty-one wells filled up, and 290 new consumers were added to the list of those who are using city water works water. This is a cheering indication that the people are losing confidence in the purity of the well-water of the city of Kingston, and I hope the time is not far distant when there will not be found a well, used for domestic purposes, in the whole municipality.

Drains.—The following tile drains were built this year, under the Local Improvement Act:—

	Feet.	Inch tile.
Victoria street	1,340	12
Stanley, Lansdowne and Adelaide street	998	"
Division street	825	"
Gordon "	731	"
Albert "	725	"
Barrie "	400	9
Princess "	280	"
Cherry "	260	"
King "	265	"
Total number of feet	5,824	

These drains have been built in very much needed districts, and the people living along the line of these streets will be materially benefited, on sanitary grounds, by their having been built.

Scavenger Work.—The work of the city scavenger this year has been very satisfactory, the present employee has done his work well, fewer complaints have been made than in any year in the past, since the work has been under the control of the health department.

There were 620 permits issued to empty privy pits, from which were taken 4,449 barrels of forty gallons capacity, 134 dead animals were removed from the public streets, lanes, alleyways and harbour, 201 yards were reported dirty and 116 privy pits. Several persons were required to cleanse their premises, and put them in good order.

I would again call the attention of the Board to the question of building branch drains to dwelling houses. The system under which this work is done is a pernicious one and productive of great danger to the health of the public, and a good deal of unnecessary expense to the individual. If the work was controlled by the corporation, as it ought to be, there would not be the defective work done in the building of these drains as is done by the irresponsible persons engaged in this work. Now that a network of drains is extending all over the city, steps should be taken at once to put a stop to the dangerous work that has been going on in this connection.

Narrow Streets.—The question of narrow streets is one which ought to engage our attention more than it may have done in the past. In all districts where the streets are narrow, disease lurks around, pestilential ail fails to find an outlet, and the inhabitants are stricken on every hand, while wide streets act as lungs to the human body, giving health and vitality to the whole physical fabric. Therefore, care should be taken that no property owner should be allowed to open a street of a less width than sixty-six feet, as is done at the present time.

Ice Supply.—Special care was taken this year to obtain the best supply of ice, for domestic purposes, the harbor could afford. All those requiring ice for such uses were made to take it beyond the line determined by the Board, and only for cooling purposes was it allowed to be cut within that limit.

Milk.—During this year twenty-eight licenses were issued to parties to sell milk in the city, each vendor entering into an agreement, under seal, to furnish milk of a standard of not less than three per cent. fat, to report any contagious disease in his family or any disease amongs this cattle, to keep his premises clean, etc., etc., and at any time his failure to do so being proven, his license would be cancelled. No tests of the quality of milk supplied had been made, as the necessary apparatus for such purposes has been but recently received. The instrument obtained is a Feser Lactoscope with all necessary instructions, procured from the Inland Revenue Department, Ottawa.

SAMUEL H. FEE, M. D.,
Medical Health Officer.

LONDON.

Medical Health Officer's Report.

Seventy-nine cases of infectious diseases were reported by physicians as follows: 41 of scarlet fever of which 8 died; 20 of diphtheria of which 10 died; 12 of typhoid fever, 7 of which proved fatal. 344 deaths occurred compared with 373 last year. Taking the population of the city according to this year's census returns at 31.240 gives a death-rate of 11.1, or in other words 11 deaths for every thousand of the population. This low death-rate, the lowest yet reached by any city and probably the lowest of any city or town in the Dominion will be more readily understood and appreciated when it is stated that the mortality last year in the thirty cities and towns of the Dominion made a ratio for the whole of 21 deaths per thousand in the population. Consumption, as usual, carried off the largest number, 41; heart disease is given as the cause of 13 deaths; cancer and Bright's disease 12 each, and la grippe, which we all hope to see no more, 7. Thirteen violent deaths occurred as compared with 9 last year, as follows: 2 by railway accidents; 4 by other accidents; 5 by drowning; 1 by suicide and 1 by homicide. The unusually large number of 34 are put down to still-born, while the goodly number of 29 died of old age. The 2nd and 3rd wards lying along the river again show the smallest number of infectious diseases. From the 1st ward there were reported 14 cases; from 2nd, 6; the 3rd and 6th wards 15 each; the 4th 20, and the 5th 19. The large number of still-born is remarkable, and out of all proportion to the whole number of deaths. The fact that the number is annually increasing should afford food for reflection for all thinking people. Still-born are no part of the deaths, not having had a separate existence they are, therefore, not included in mortuary returns. Apparently there was a larger number of cases of infectious diseases than last year without, however, a corresponding increase in the number of deaths. This must be accounted for from the fact that medical men report cases more promptly.

Of the sanitary work done during the year 124 visits were made to country dairies and 222 samples of milk examined at the Health Office besides many samples of water. 19 contaminated wells were closed; 23 caused to be cleaned; 13 persons made to connect their premises with the common sewer and a careful inspection of all meats sold upon the market. In general the meat was of good quality. Some were condemned and destroyed. One carcass, that of a sheep, offered for sale by a Westminster butcher or dealer, was found to be affected with tuberculosis. 103 citizens' complaints were received compared with 76 last year, which might suggest to evil minded persons a lack of charity and brotherly love among the people of London. Many anonymous letters are received complaining that this person or that has an infectious disease in his or her family which has not been reported. These statements, upon investigation, are generally found to be incorrect.

The draining, of what is called "Geary's Flats" in the 6th ward, by direction of the Board of Health was a sanitary work which will prove of great benefit to that part of the city, but much of the good resulting from this will be negatived unless sewers are laid down on Craig street and the part of the Wortley Road in order to intercept the sewage which still flows into these flats.

One of the most important things in connection with the sanitary condition of the city is the plumbing. On several occasions I have directed the attention of the Local Board to the necessity of having the Council exercise some supervision or control over the plumbing done in the city, and protect, as far as possible, those who are obliged to live in rented houses from slow poisoning by escaping sewer gas. Much of the plumbing done in the city is of the cheapest and worst description. The Council has the power to pass a by-law regulating plumbing work and remove this source of danger from the people.

The frequent and thorough flushing of the sewers in dry weather is absolutely necessary for the preservation of the public health, but as our sewers are constructed it is impossible to flush them in the way it should be done in order to accomplish the desired results with as little waste as possible. Much of the force of the water is lost before

reaching the sewer proper by having to pass through so many angles. To obviate this I would recommend that man-holes be placed at the intersections of the trunk sewers like the one the City Engineer recently put down at the Wellington and Waterloo crossings.

A number of deaths recently occurred in a neighboring city from contagious disease contracted at public funerals. In this city public funerals have been held and the public invited and allowed to see the body where the persons had died of an infectious disease before the Health Officer had received any notice of the death. In order to secure prompt information of all such deaths I would advise that at the next meeting of the Council a by-law be passed making it compulsory for undertakers to register deaths at the Health Office. The new amendments by the Provincial Board of Health to the regulations governing epidemics of diphtheria, which is now in force, read as follows: "No person sick with diphtheria, or the body of any person having died of diphtheria, shall be removed at any time except by direction of the Medical Health Officer." Section 7 is as follows: "In case of the death of any person suffering from diphtheria or croup the Medical Health Officer shall at once be notified by either the physician or party in charge of the body, and the Medical Health Officer shall take such steps in the preparation of the body as he may deem necessary."

In some of the slaughter houses in the vicinity of London the practice prevails of feeding hogs on the refuse of slaughter houses. Without doubt the flesh of hogs fed in this manner is unfit for food. I would recommend the Board of Health to take whatever action they see fit to prevent as far as possible the sale of such meat in the city.

Consumption, which annually causes the largest number of deaths, being readily communicated from one person to another, is in other words, a contagious disease. School Boards should exercise care and discrimination in the selection of teachers for our Public Schools and employ none who show any signs of this insidious disease which so many have, yet so few are willing to admit.

Although a site for a small-pox hospital or cottage was selected last winter by the Board of Health at the south end of Colborne street on the bank of the river, nothing has yet been done towards erecting a suitable building. The site is as good a one as can be obtained; the soil dry and sandy; the drainage good and a safe distance from the general Hospital or any dwelling, and in the opposite direction to the prevailing winds. The building could be a frame hospital on the pavilion plan as in Montreal, or what is called "The Bunker Portable Hospital," costing about $600 and intended to be burned at the close of the outbreak. This, of course, would be expensive. A permanent building costing $1,500 painted with special material which could be thoroughly disinfected when disease had appeared would be the best for this city. Plans of these hospitals will be submitted if required.

What we should do with our sewage is still an unsolved problem. Year after year I have recommended the plan of constructing an intercepting trunk sewer along the river for the purpose of conveying all the sewage to an irrigation farm below the city instead of allowing it to enter the river. This trunk sewer would collect the sewage from the other sewers making them as it were tributaries, carrying it along the left bank of the river to the low lands below the Cove and having sufficient fall, pumping engines or tanks would not be required. One acre of land is enough for 1,000 people; 18 acres would be quite sufficient for London.

The disposal of sewage by spreading it over land where it is speedily destroyed by oxidation is coming more and more into practice by cities in America and Europe. The sewage from the London Asylum for the Insane with 1,200 inmates has been successfully disposed of in this way for three years on the same four acres of land, and there is no reason why it should not prove as successful for all time to come. Fear that a point will be reached when supersaturation of the soil will take place is groundless. Destruction of deleterious, liquid matter when spread upon soil and exposed to the action of the air and sun is sufficiently rapid to prevent the creation of disease germs. The plan of placing large tanks at the mouth of the sewers and treating the sewage by chemicals before it reaches the river, is expensive and will never be effective. The objection to the inter-

cepting sewer is the cost, but sums of money will be spent in litigation constructing flood gates at the dam and other experiments, but sooner or later the city will have to face the music. Through the laudable efforts of the chairman of the Board (Alderman Ivey) plans and estimates of the cost of this sewer are now being prepared by Mr. Willis Chipman, C.E., of Toronto, and it is hoped that before the end of another year this constant source of trouble and annoyance, the disposal of the city sewage, will be arranged to the satisfaction of all parties.

T. V. HUTCHINSON, M.D.,
Medical Health Officer.

OTTAWA.

Medical Health Officer's Report.

The total mortality during the year from all causes has been 908 exclusive of still-births. Reckoning the population of Ottawa at 45,000, this gives us a death-rate per thousand of 20.17—a very fair showing upon the whole it must be admitted. Notwithstanding this fact however, it will be observed from a comparative table here appended that our death-rate from zymotic or preventable diseases is still much larger than it should be; thus of the 908 deaths during the present year 310 are due to causes classed under the head of preventable diseases.

It should be remembered, however, that by far the larger number of these have succumbed to diarrhœal disorders which during the summer months generally prove so destructive to infantile life, and that the death roll in this class is largely swelled by our foundling institution, the inmates of which are recruited far and wide throughout the surrounding country.

Among other diseases which have contributed their victims in this class, we have scarlet fever, diphtheria and croup. Twenty-four deaths resulted from the first during the year whilst the two last had claimed 30 and 14 respectively.

The fatalities from scarlet fever, an epidemic of which prevailed throughout the city during the past year, were fortunately few compared to the total number of cases of this disease that occurred. The very mildness of the type of the disease being a cause of its spread by people often poor financially but rich in progeny, and not always prepared to call in the doctor for every apparently slight ailment that may occur in the household, and who have had the diseases without knowing it unwittingly have been the means of spreading the infection.

Diphtheria and croup, though not largely prevalent at any time during the year, kept constantly cropping up so that at no time was this Department, which exercises a special surveillance over them, without some such case in the isolating hospitals or outside of these, in private houses. Proportionately according to numbers, far more fatalities from these diseases occurred among the German population. Possibly owing to their too frequent disregard of hygiene living and their determined obstinacy in caring for such cases in their own peculiar ways.

Typhoid fever, which is also included in the above mentioned class of diseases was less prevalent this year than in previous years. Thus instead of nineteen (19) deaths from this cause as recorded for last year, there are but nine for the period covered by this report. If we take into consideration the facts that during the latter parts of the summer and early in the fall, the waters were very low, a condition said to be favorable to the development of this disease and that in many places within the city there was going on upturning of the sub-soils, necessitated by the construction of drains, a circumstance also favouring the development of this disease, if not actually capable of originating it, we seemingly have in the limited number of fatalities from this cause satisfactory evidence of the wholesomeness of our water supply.

The Hospitals.—The two hospitals for the isolation and care of infectious diseases have been maintained throughout the year on a satisfactory footing of efficiency and the degree of usefulness of these institutions may be inferred from the following records of the past year which show that 131 cases were treated therein with 14 deaths; the full details being given in a table here appended.

The number of infectious cases reported to the Health Department during the year were in all 335 as follows:—

Scarlet fever	196
Diphtheria	80
Measles	32
Typhoid fever	27
Total	335

Owing to the fact that isolation is not enforced in typhoid cases as in others above mentioned, I have not as rigidly exacted from physicians the report of cases of that disease and consequently I do not look upon the number of typhoid fever cases reported above as representing the number of cases that did actually occur in the city during the past year.

The revised and consolidated by-laws which came in force this year have amended the by-law effecting the milk supply of this city in force during the previous year in such a way as to make its workings rather unsatisfactory owing to the fact that some of its clauses are found to be actually impracticable to the ordinary milk vendor; and the fact also that the carrying out of the provisions of said by-law are to a very large extent under the control and supervision of the Police Department. Little or nothing was done during the past year as regards the testing of samples of that article of food. It is apparently a case in justification of the saying that what is everybody's business is nobody's business or that too many cooks spoil the broth.

The ice supply of the city for household use is taken altogether from the Ottawa River. Some ice dealers take all their supply from above the Chaudiere Falls whilst others take part above and part below the Falls at such points as are permitted by the present regulations of this Department. As regards these, I believe that if they consulted their own interest in a business point of view they would take all their supplies above the Chaudiere Falls and thereby all compete on an equal footing in offering their customers an article of equal purity.

Taking all circumstances into consideration it is gratifying to know that the present year upon the whole has been marked by satisfactory progress in sanitary improvements. Thirty-three subsidiary sanitary drains on as many streets of the city have been recommended during the year by your Board and approved of by the Council. Some of these are now being completed, among the most important of which are drains on Albert, Queen street west, Sparks, Clarence and Bolton streets.

Others will no doubt be pushed to completion during the present fall whilst a number possibly will not be under way until the next season.

The great benefits in a sanitary point of view resulting from these drains already constructed are being duly appreciated by the people, and gladly taken advantage of by this Department whom they enable to effect the removal of unsanitary conditions and in some localities the abatement of that unmitigated nuisance the privy pit.

For details in this as well as for all matters more immediately under the control of the Sanitary Department I beg to refer you to the Sanitary Inspector's Report.

The system organized to effect the removal and disposal of household refuse and general yard cleanings, early last spring, like all undertakings of this kind in their beginnings, has not given that amount of general satisfaction during the past year which experience and some modification of the contract will enable this Department to effect in

the future. To a very large number, however, it supplied a long felt want and facilitated the performance of that important work of sanitation.

It is gratifying to know that the school authorities from year to year have been improving the condition of our schools both Public and Separate, as regards ventilation, heating and closet accommodation to a degree commensurate with their responsibilities and the importance of the above mentioned matters to the welfare of their charge. Among the improvements that were effected last year in this respect I gladly record the fact that half a dozen or more of our schools, with a past appreciation of the hygienic condition of their surroundings, have removed therefrom the objectionable privy pits to replace them with metallic troughs in connection with our water system by which they are cleansed thoroughly every 24 hours.

As regards scavenging and all details pertaining thereto I wish to refer you again to the Sanitary Inspector's comprehensive and intelligent report for the year just ended and dealing specially with such matters.

In concluding this report I feel it to be an act of justice incumbent upon me to bear testimony to the sobriety, energy and worthiness of the men employed in the Health Office; at the same time permit me, gentlemen, to direct your attention to the inadequacy of the salaries paid these men as well as to the officers under whose charge they are working.

The nature of the duties which officers of the Health Department are required to perform call for the exercise of prudence, tact, courage and endurance to an extent seldom demanded of the employees of any other department of the Municipal Government.

Such qualities should be remunerated to a degree more nearly commensurate with the duties performed.

A. ROBILLARD, M.D.,
Medical Health Officer.

STRATFORD.

Medical Health Officer's Report.

I would congratulate you on the awakening of the people up to the proper support of their sanitary interests. This is evidenced by the action of the Board in taking cognizance of all unsanitary conditions which endanger the public health, and discussing sanitary requirements intelligently, by the people in their more cheerful compliance with all health regulations, by the number of complaints regarding the unsanitary condition of their neighbour's surroundings, by the comments of the press, relative to existing contagious diseases, by the amount of sanitary work done, and last but not least, by our exceedingly low death rate.

This is as it should be for no other temporal interest can be compared in importance with that of popular sanitary education. Generally speaking, the causes of our unnatural mortality depend on public conditions which can be reached only by public measures brought forth by every class identifying the public good with that of its own in sanitary education. The Board being sensible that sanitary reform can best be bettered by educating the people to understand the pecuniary profit of public health, is desirous to do away with every possible unhealthy circumstance without using arbitrary or extreme measures or conflicting seriously with personal pecuniary interests.

Our death-rate for the past year has been exceedingly small, there being 101 deaths giving the low general death-rate of 10.1 per thousand in a population of about ten thousand. Of these 20 were due to zymotic causes, chiefly diphtheria. The number of cases of this disease reported during the year were 39 of which 18 cases proved fatal. This was the result of a local outbreak of the disease of a very malignant character, during

the month of May, which was traceable to a child having attended school while suffering from the disease. By great watchfulness, prompt and efficient isolation and disinfection, what threatened to be a dangerous outbreak was averted.

There have been 36 cases of typhoid fever reported with two deaths. This together with the fact of no deaths occurring from scarlet fever is a matter for congratulation.

There were a number of cases of measles reported during the spring but it was of a very mild type, consequently no fatal cases.

There have been only six deaths from consumption, a small percentage of the number of deaths.

Milk Supply.—The milk supply of the city is furnished from about twelve dairies, all of which have been inspected, particular atttention being paid to the nature of food used, the condition of stables and premises as regards ventilation and drainage, and state of the udders, and the water supply. With one or two exceptions these were found satisfactory. The milk from these dairies was tested six times and results published. On the whole it made a very good showing. I am pleased to note a great improvement in our milk supply.

Garbage.—Last year I directed the attention of the Board to the necessity of pro viding some system for the frequent removal of all vegetable and animal refuse from private yards. This is a matter of no small importance as decomposing organic matter is one of the most fruitful sources of diphtheria and other fevers. To have this done efficiently a by-law should be passed appointing some responsible person to remove such matter at stated times, at fixed rates.

Hog-pens.—From the Inspector's report I find there were 41 pig-sties in the city of which all were ordered to be cleaned and 16 removed. A number of complaints have been made during the year of their being a nuisance and as it is almost impossible to keep them clean, particularly in warm weather, I would urge upon the Board the necessity of asking the Council to pass a by-law prohibiting the keeping of pigs within the city limits.

Inspection of New Houses.—Three or four cases of typhoid fever have come under my notice of late, the cause being attributable to a lack of proper trapping and ventilation of the cellar drain. This suggests the necessity of having a systematic inspection of all new houses and putting in force the regulations of by-law 15, regarding the construction of houses, drainage plans, ventilation of drains, description of drain pipes, etc.

The owners of all new houses were informed that the policy of the Board was to enforce the dry-earth system, and the necessity of its adoption was urged upon them. The result was that this system has been adopted in nearly all of them, the remainder from convenience or choice preferring a cesspool.

Schools.—In company with the Chairman of the School Board I personally visited the school premises and found the sanitary condition good with the exception of one or two of the closets. The Chairman with his usual promptness in business had the matter at once attended to. I have pleasure in stating that the trustees and teachers do all in their power to protect the children against the destructive agencies in the form of infectious and contagious diseases.

Our Streets.—The Street Commissioner deserves credit for the removal of the mud from some of our principal streets. This mud, which is mixed with decomposed vegetable and animal filth, when dry is blown in the form of dust and inhaled becoming frequently a source of diphtheria, bronchitis, fevers, etc. Apart from its abatement and removal of unsanitary conditions and surroundings, it makes our city more cleanly and more attractive to our own citizens as well as to the visiting public.

J. A. ROBERTSON, M.D.,
Medical Health Officer.

ST. CATHARINES.

Chairman's Report.

The duties expected to be performed by a Local Board are sometimes not of a very pleasant nature, but the work of the past year has not been arduous, the Board depending principally upon the Inspector, who reports monthly of all work or other requirements coming under his supervision.

The general health of the city is fair, with the exception of a little flurry over scarlet fever which appeared to be of a mild form. The citizens themselves by a little precaution could assist to a large extent in preventing the spread of contagious diseases.

The Health Act and its requirements have not been fairly understood by the general public; this we have endeavored to remedy by having printed extracts from the Public Health Act circulated among families and at the public schools.

Out of the thirty-nine cases of infectious diseases reported by physicians only two were reported as ending fatally.

The number of deaths as per City Clerk's return for all cases during the year is 117, from which I take the liberty of deducting ten deaths from the following causes: Old age, 3; still born, 4; suicide, 1; drowned, 2; leaving the actual deaths from ordinary diseases only 107, or a death-rate of 10.7 per one thousand, which is probably the lowest of any city on record.

The sanitary work of cleaning closets and cess-pools, should be prosecuted with more energy than has been heretofore shown. A larger staff of scavengers should be employed, and the Inspector should see that the work is thoroughly done in all cases, without any exception. All closets must be cleaned out and disinfected.

And then with the system of drainage inaugurated, and a general use of city water, a thorough cleaning up, and all physicians properly reporting infectious diseases, there is no reason why we should not enjoy a still greater degree of healthfulness than ever.

S. G. DOLSON,
Chairman.

Statement.

The number of Medical Returns of contagious diseases for the year ending 15th November, 1891, is 39 cases as follows:—

Typhoid fever	12
Diphtheria	6
Scarlet fever	16
Measles	5
Total	39

And the number of deaths reported is 2.

TORONTO.

Medical Health Officer's Report.

During the past year many important changes have been made in the management of the Department. Your ready acceptance of my recommendations has enabled me to appoint a staff of specially trained men to the posts formerly occupied by those possessing no special qualification for their work. The good results following the adoption of this system are so obvious and have created so much popular approbation that no comment is necessary here. This change is simply in accordance with the progress made by other large English and continental cities in sanitary matters.

But in spite of the advance made in this respect, the causes of preventable disease remain largely the same, and the death rate in the past year from this class of disease has been high. We have been visited by a severe outbreak of diphtheria and typhoid fever, the origin of which this Department has, by diligent investigation into individual cases, been able to trace, in the majority of instances, to specific unsanitary conditions. The presence of foul privy pits has been the most prolific source of these diseases, and promises to be the most permanent evil the Department will be called upon to deal with; for here we meet the opposition of a formidable array of landed interest. I am glad, however, to be able to state that with your indorsement, measures have been taken for the proper isolation of the diseases referred to. Funds have been provided for the building of a quarantine hospital, where all contagious and infectious diseases may be effectually isolated. An appropriation of $1,500 has been made for the erection and equipment of a superheated steam disinfecting station, where all infected clothing may be disinfected.

During my term of office I have caused regular analyses of milk to be made by the analyst of the Department with highly satisfactory results. The quality of milk has been first class Tubercular diseases, constituting as they do one-seventh of the aggregate from all causes, demand most careful consideration. In this connection herds have been inspected, infected animals destroyed, and the possibility of infection thus averted.

The city water, as shown by analyses, though variable, has been on the average good. The recent action of your Board in prohibiting the cutting of ice from the bay will, without doubt, raise the future quality of our ice supply, and we may therefore eliminate it from the category of Toronto's disease producing sources.

Your Board has taken effective measures in prohibiting the use of garbage dumps in the city, and deciding that instead fire shall in future be the means of destruction. By this process all the disease-breeding matter will be destroyed, and the chance of infection therefrom avoided. I beg to congratulate you also upon the improved sanitary condition of Ashbridge's Bay and the Don lagoons. Your action in these matters has probably been the means of preventing an epidemic. It is worthy of remark that these parts of the city have been the least affected by recent outbreaks, and it is to be hoped that permanent improvement will minimize the possibility of future visitations.

The question of an abattoir has engaged a considerable portion of our attention during the past year. The principal cities both of Europe and America pronounce strongly in favour of the abattoir system. Many diseases, such as hog cholera, trichinæ, tuberculosis, etc., otherwise propogated, are by this means effectually avoided. In this respect we are behind other cities, but it is hoped and expected that this will not long be the case. During the past year there was an outbreak of hog cholera, but happily its progress was checked in Toronto. The more recent outbreaks in other parts lead us to suspect that the authorities at Ottawa have failed to act promptly in the matter.

Although typhoid fever and diphtheria have been more prevalent in this district than in any other in the city, proving that the sanitary condition is not what it might be, there are few nuisances of sufficient importance to require special mention in this report. Complaints received both from citizens and house to house inspectors nearly always deal with minor matters, and have special reference to privy pits. The following are a few of the most important matters coming under the notice of the Department in this district:

In the vicinity of Manning avenue and Bloor street, and within a radius of a quarter of a mile, there are situated 15 slaughter houses. These have all been visited at one time or another during the past summer and have always been found to be in a scrupulously clean condition. Notwithstanding this the residents in the locality complain most bitterly of the odors arising from them, especially in the summer months. The smell is so bad that even on warm evenings the residents are compelled to keep their doors and windows closed and to remain indoors. There is such a unanimity of opinion that there can be no doubt of the truth of this. I can quite credit their statements, as even when these places are kept perfectly clean their number would be sufficient to give rise to the vile smells no matter what care may be taken to keep them in a proper condition.

Scavenger Dumps.—The neighborhood most imposed upon in this respect is also in the vicinity of the slaughter houses mentioned above. About here there are numerous ravines which they have been attempting to fill up with scavenger refuse. These ravines are so deep that it is impossible to drain them. The rain water lodges in them, and as all sorts of refuse, both animal and vegetable, is deposited there the smell when decomposition sets in is something vile. Since this has been complained of the dumping has ceased, much to the relief of the residents in the vicinity.

Contagious Diseases.—Great difficulty, inconvenience and in many cases impossibility has been experienced in the isolation of cases of infectious disease owing to lack of hospital accommodation.

A house to house inspection was made of the district bounded on the south by Queen street west, on the east by Yonge street, on the west by University street, and on the north by Avenue street. A few houses remain to be inspected in this district, in which, as well as in the district mentioned above, we found privy pits which had not been cleaned for three years or more. Some of these pits were in as close proximity to the kitchen door as two feet. In several of these pits there were thirty-two barrels or more to be removed. It is to be greatly regretted that our present by-law does not provide for the removal of these pits in any case. A very striking example of this may be seen on Elizabeth street, near Queen street, where the privy pit of the house on Queen street is placed not more than two feet from the kitchen door of the house on Elizabeth street.

The Elizabeth street house is a first-class building, while the Queen street house is very inferior, yet our police magistrate holds that under the present by-law we cannot compel the removal of this privy pit. Another very striking example may be seen in the rear of Frichot street, where a row of fine brick houses cannot be rented because of a row of no less than nineteen privy pits which are only ten feet from the rear of the houses. In many large factories where many men are employed, an immense pit is in use without any adequate provision to prevent a nuisance being created.

Report of Medical Health Officer re Abolition of Privy Pits.—During the past three months we have been carefully analysing the various complaints received in this department, and find from a careful examination that from sixty to sixty-five per cent. of the complaints received, are based on nuisances caused by the presence of privy pits. In the older portions of the city the percentage is even higher. Such a complaint received, a notice is sent to the owner, the privy is emptied and the nuisance abated; but only for a time. In a few months, certainly by the end of a year, the pit is in exactly the same condition. Another notice is sent, and so it goes on. It is plain from this that sixty to sixty-five per cent. of the work of this department is of no permanent benefit. These pits are nearly all made of boards nailed together, and no attempt is made to have them water tight. The fluids consequently soak through into the earth, saturating it with filth, and remaining there after the privy is emptied. A great many people think it quite an advantage to have these loose boxes so that the liquids may run out, and will often, when ordered to empty a privy pit, complain that it is only water that is in it, and if left alone it will soak away in a short time. In certain sections privies are so numerous and so close to houses as to be a menace, if not positively dangerous to health. The denser the population the fewer the water closets, seems to be the rule, the more closely built portions having nearly all pits. In many cases there are houses built in the rear. These almost invariably have pits, and in nearly every instance the privy is placed just where the kitchen door is located, or beside it. In warm weather, especially, the air is contaminated, and the smell is distinctly perceptible. Contaminated air is heavier than pure air, and generally stinking organic vapors are heavier than, and tend, on that account, to hang around the localities from which they emanate. The report of the General Board of Health to the British Parliament, concerning the administration of the Public Health Act, and the Nuisances, Removal and Diseases Prevention Acts from 1848 to 1854, says: "In another instance the abolishing of cess pools and their replacement by water closets, together with the abolishing of brick drains and their replacement by self-cleaning stoneware pipes, has been attended with an immediate and extraordinary reduction in mortality. Thus, in Lambeth Square, occupied by a superior class of operatives in the receipt of high wages,

the deaths, which in ordinary times were above the general average, or more than 30 in 1,000, had risen to a rate of 55 in 1,000. By the abolishing of cess pools, and the construction of water closets, and with the introduction of tubular self-cleaning house drains, the mortality has been reduced to 13 in 1,000."

The reduction of the mortality was effected in precisely the same districts, and among the same occupants, without any change in their habits whatever.

"In the case of the Square, when cesspools and drains of deposit were removed without any alteration whatever in the adjacent sewers, fevers disappeared from house to house, as these receptacles were filled up and the water closet apparatus substituted merely in consequence of the removal of the decomposing matter to a distant sewer of deposit or open water course. If the mortality were at the same rate as in the model dwellings, or in the improved dwellings in Lambeth Square, the annual deaths for the whole of the metropolis would be 25,000 less."

The committee appointed by the Society of Arts in 1876, to enquire into various subjects in connection with the health of towns, among their conclusions have the following:

"For health's sake, without consideration of commercial profit, sewage and excreta must be got rid of at any cost. That the pail system, under proper regulations, for early and frequent removals, is greatly superior to all cesspools and ash pits, and possesses manifold advantages in regard to health and cleanliness, while its results in economy and faculty of utilization, often compare favorably with those of water carriage sewage; that all middens, cess pools and privies, in towns, should be abolished by law.

Again, the committee appointed by the Local Government Board, in 1875, report: "That the retention of refuse and excreta in cess-pools or other places in the midst of towns, must be utterly condemned."

There can be only one opinion, privies should not exist in cities. The first great step toward the improvement of the sanitary condition of Toronto should be the abolition of all privies. It is undoubtedly highly desirable, the only possible objection being expense, which, in the face of this overwhelming evidence, I do not think should be considered, in such a sanitary improvement, whereby hundreds of lives may be saved.

In examining into the last 249 cases of zymotic disease, as to cause, I find these occurred in 228 houses. Of these, 63 per cent. had foul privy pits. Experts agree with the view that virus of diptheria may lie dormant until suddenly an environment of foul and putrescent material affords the requisite for its development, and outbreaks are the result.

Recommendations.—In view of the above facts I would recommend that a by-law be passed to compel owners, lessees, etc., of real property, to fill up these privies, and substitute therefor, either water carriage or the improved pail system. It is impossible for us in Toronto to think of wiping out contagious and infectious diseases in our midst by any precaution or treatment, while effective machinery for their reproduction is in existence, and in all cases which we have been able to trace, and which have been reported to us by medical men throughout the city, all are unanimous in condemning the privy pit as the most prolific cause of these loathsome diseases.

CORRESPONDENCE RE PRIVY PITS.

OFFICE OF THE MEDICAL HEALTH OFFICER,
TORONTO, September 28th, 1891.

To His Worship Mayor Clarke, City Hall:

DEAR MR. MAYOR,—I have to-day received letters from Professor William Oldright, M.D., Dr. Cassidy, Chairman of the Provincial Board of Health, and Dr. Bryce, Secretary of the Provincial Board of Health, addressed to Your Worship, and setting forth

their opinions as to the necessity of abolishing privy pits as proposed by the Board of Health. As these gentlemen are eminent sanitarians, and, as therefore, their opinions must carry great weight in this matter, I would ask your Worship that these letters be printed and placed before the members of the council at their meeting to-night.

Respectfully yours,
NORMAN ALLEN.

TORONTO, September 26th 1891.

E. F. Clarke, Esq., M. P. P., Mayor of Toronto:

SIR,—I have been informed that there is still some opposition to the passage of the by-law for the abolition of privy pits, and have been requested, in common with some other medical men, to send you an expression of opinion on the subject. It is so difficult to understand how any well-informed person in this last decade of the nineteenth century, can defend these disgusting relics of barbarism, that I hardly know what points to take up in a letter which must necessarily be brief.

1. The extent and magnitude of soil pollution is one point of which few people, I think, have an adequate idea, and I will give one or two facts to illustrate it. In one block in St. John's Ward, 67 x 200 yards, a physiological calculation shows that there are deposited annually, from 14 to 18 tons of solid excreta. What must be the condition of the soil? This question may find some approach to an answer from the statement of two observations of the excavation of sites much less thickly settled: When the Wellesley School required an addition some four years or so ago, the site, about 43 x 28 feet, was excavated down to the clay, and the soil on the surface of the latter gave forth a strong odor. This resulted from the filth spreading from a row of school privies on the east side of the site, towards a well at the south-west angle of it, about 50 feet distant. A more recent example was the stench arising from an excavation for a cellar on King Street, the emanations from which excavation, gave rise to a case of diphtheria. I called the attention of the Health Department to the circumstances of this case at the time, as it was a good object lesson on soil pollution.

2. I have again and again traced cases of disease to privy pits, and can name specific cases to the Health Department, if required to do so.

3. From the statistics collected by sanitary authorities *re* privies, I think we may safely say that hundreds of persons are annually killed in our province by these abominable pits. The share of Toronto would be over 200 if they were allowed to flourish without any restriction. I trust that the aldermen will realize their responsibility for the loss of life consequent upon their partial retention.

4. I have been given to understand, as I readily can, that the stirring up of these collections of filth, in the process of the cleaning out of pits in certain sections of the city, has been followed by the outbreak of cases of diphtheria and typhoid fever, and that these outbreaks have been anticipated and verified by the officials of the Health Department.

I would point out to those persons who seem more influenced by a financial than by a humane consideration of this question, that any laxity or half-heartedness in regard to health matters, is going to injure our business interests. We have a beautiful, healthy, thriving city, and we must maintain its reputation.

Hoping these few disconnected observations will be received in the spirit in which they are written.

I am, yours truly,
WM. OLDWRIGHT.

Toronto, September 28th, 1891.

E. F. Clarke, Esq., Mayor of Toronto:

Your Worship,—In reference to the proposed by-law which provides for the abolition of the noisome privy pits in this city, I have little to say except words of praise. Even though our water supply is not poisoned by these, the air in the vicinity of the dwelling is made noxious, more particularly to children who pass much of their time in the yards. I am in favor of introducing a water closet into every dwelling and house of public resort in the municipality. If, for any sufficient reason, a water closet cannot be obtained, a dry earth or ash closet, under municipal control, should be the next best system.

To sum up thus: In my opinion the best system would consist of a trunk sewer, treatment of sewage at the outfall and discharge of putrified effluent into the bay. 2. The general use of water closets preceded by the abolition of privy pits until the more expensive improvements can be brought about. The use of water closets should be encouraged, the disuse of privy pits made obligatory, dry earth or ash closets under municipal supervision being substituted, and a large crematory should be provided for the destruction of the excreta and any other offensive garbage.

Your obedient servant,
J. J. Cassidy, M.D.

Toronto, September 28th, 1891.

To Norman Allen, M. D., Medical Health Officer, Toronto:

Dear Doctor,—In reply to your request that I should present my views with regard to the proposed by-law for the abolition of privy-pits from within a certain area in Toronto, I have to say that the necessity for the measure has so long been apparent, that the repetition of arguments therefor, at the present day, seems wholly superfluous.

But from the standpoint of a local nuisance, their existence in populous neighborhoods is intolerable. To think that the evaporation from them in the long, dry summer months, makes it possible for the germs which are present in such receptacles, to be borne into the air with every breeze, to be added to all other air pollutions of a city, is enough to demand their immediate abolition by all who wish to improve the city's health.

To indicate how laden is the air of the city with germs of various kinds, it may be said that one minute's exposure on a glass plate of some medium which aids their growth, will show in twenty-four hours numerous forms to have settled on a surface of six square inches; while a delicate balance will show a change in weight if an object be exposed for an hour to the free air of a laboratory.

The existence of sewers on most streets makes the adoption of some form of water carriage for sewage, possible, and by far the most practicable and sanitary method.

Nearly every premises on the clay soil of older Toronto requires a sewer to drain the cellar and foundation walls. The same house drain, once laid, can be easily made to do service both for this purpose and for carrying sewage and house slops.

The easy, efficient, and least expensive apparatus is a porcelain sink, placed in the outer kitchen or shed adjoining the house, leading to the drain, and having a trap with a manhole for cleaning it, placed beneath the frost line. The drain would be ventilated on the sewer side by a pipe running high into the air outside the house. A water-pipe for flushing the sink is laid from the kitchen tap, and may be turned on there when required. This constructed for a few dollars, (not exceeding $10 or $15) will dispose of house slops, kitchen slops, and by a convenient cover arrangement added, may be used as a water closet.

This method, once systematically undertaken by your department, would so speedily convince landlords of its cheapness, and occupants of its convenience and sanitary value, that I am certain the cumbrous and imperfect—because troublesome—system of earth closets would not be thought of.

After years of observation of practical methods of sewage disposal, I am more strongly than ever in favor, for large cities, of the principal "*tout à l'égout*," *everything to the sewer*, which is prevailing more and more every year.

I have the honor to be,
Your obedient servant,
PETER H. BRYCE,
Secretary

Report on Hog Cholera in Toronto and Vicinity.—In August last word was received at this office of the existence of a disease among hogs in the district around the city, the name or cause of the disease being quite unknown to the owners. Information was also received at the time that the meat of hogs suffering from the disease, and having died from it, was being offered for sale by the butchers of the city. I immediately proceeded to investigate the truth of these reports. Many of the places where hogs are kept, especially in the district east of Toronto, were visited, and in almost every instance it was found that either the disease was present or had existed during the last few months. In some cases men had lost as much as 75 per cent. of their stock, one man informing me (and he is only in the business in a small way), that he had lost $200 worth in one week. Sufficient evidence was also secured to show that the majority of these hog raisers, finding that the disease had been so fatal in the past, now kill the animals as soon as the disease manifests itself. As there seemed to be nothing known as to the cause of the disease, or as to its nature, an investigation was made with the following results:

Symptoms.—The first indication is the refusal of the hog to eat. The animals affected refuse to move and isolate themselves from the rest of the herd, or if they attempt to walk their movement is a staggering one. They are affected with a cough, the eyes become watery, the ears assume a dark purple color, and the belly also becomes of a darkish hue. In many cases purging is present, although not always. Death ensues in from three to fourteen days after the animal is affected—rarely later.

Post Mortem Appearances.—Both lungs are solid. Pericardium full of serum. Sometimes heart adherent. Spleen more or less enlarged, dark and friable. Large intestine with numerous yellowish looking ulcers of the "punched out" variety. These are especially numerous in the coecum. A microscopic examination of the lungs showed the condition to be one of simple pneumonia in the third stage. The heart lesions simply indicate pericarditis. The ulceration of the intestines strongly resembles typhoid ulceration in man. A culture has been made of the germ obtained from the lung, and has been identified positively as the germ causative of hog cholera. The above symptoms and post mortem occurrences also agree with this diagnosis, and there is no doubt in my mind that this is the disease under consideration. In further proof of the above two rabbits have been inoculated, one dying on the seventh day, with symptoms such as are produced in rabbits from the germ of this disease. A dog has been fed on the meat of a hog dying of this disease, but no effect has been so far noticed.

This disease is essentially North American. The only literature found dealing with the subject is the report of the Bureau of Agriculture at Washington, as to the danger to man from eating this meat. This report states that there are only two diseases allied to it, typhoid fever and dysentery. The connection of this disease with typhoid is rather vague, on account of the latter being a universal disease, whereas hog cholera, as stated above, is essentially limited. With dysentery, the connection is much more close. It cannot be positively stated that the eating of this meat would cause either condition in man, but to say the least, it must be regarded with suspicion. Under sec. 99 of the Consolidated Health Laws, it is specified that hog cholera is a disease in which the meat of animals so suffering, is unfit for human food. We have communicated with the Department of Agriculture at Washington, as to the danger to man from eating this meat, and they have replied that they have heard of no case where hogs so affected have been eaten. From the Provincial Bureau it is learned that there has been only one known outbreak of this disease in Ontario.

As there is great danger of this pork being used as human food, and as it may seriously interfere with the great hog trade of the city, I think that immediate steps should be taken to eradicate the disease. This can only be done by killing and burning or burying deeply all animals so affected, and isolating all not affected, then thoroughly disinfecting the premises by prohibiting the keeping of hogs again on the same, for a period of one year.

I would therefore advise that your Board communicate the above facts to the Government Inspector, Dr. Andrew Smith, with the request that he should take immediate action as indicated. On investigation I find that the men who keep these hogs feed them to a great extent on offal from slaughter houses, and the swill from hotels and restaurants. It is possible that this swill, if used fresh, may make good food for hogs; but there can be no doubt that the feeding of flesh is highly dangerous, as in this way many of the diseases peculiar to animals, are known to spread. I would therefore advise that your Board adopt certain additions to By-law 2478, whereby no one should be allowed to sell meat in the city of Toronto, unless licensed by the Local Board of Health to do so, and that all butchers so licensed should (on pain of having his license revoked if not complying), notify the Health Officer in any case coming to his knowledge of diseased animals or meat; that the use of all slaughter houses be prohibited for the feeding of hogs, and that no swill shall be used unless in a perfectly fresh state.

All of which is respectfully submitted.

NORMAN ALLEN, M. D.,
Medical Health Officer.

TOWNS.

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses, etc.,	Removal of Garbage and night soil.
Strathroy	The proper inspection of dairy cows and their surroundings.	.....	.....	S. F. 3.	Healthy state due to system of drainage.	In tolerably good condition.	
Woodstock	House to house inspection. Milk sold, tested and found good.	Pure water supply will lessen death rate. Some well waters found bad on examination, used by schools.	Several cases of diphtheria and typhoid.	T.—4 deaths.	The deepening of a creek to carry off sewage recommended. Also the condition of Close's pond referred to.	.....	700 dry earth closets in use. Council to regulate disposal of night soil.
North Toronto	Thorough inspection on part of inspector where infectious diseases existed.	System of water supply in course of construction.	The law *re* reporting of infectious diseases to be strictly enforced.	D.—5. T.—11. S. F.—5.	.....	Thorough inspection of slaughter houses and pigpens.	Dry earth closets to be established instead of privy vaults.
Brockville	Milk supply on the whole reported good. Whole town thoroughly inspected.	An excellent water supply and sewer system lessens the diphtheria and typhoid cases.	.....	D.—4. T.—16. S. F.—30.	.....	Slaughter houses looked after.	
Dresden	House to house inspection made.	.....	.....	D.—1. T.—2.	.....	.....	The adoption of dry earth closets recommended.
Dundas	Inspection of all yards, etc. made.	Well water impure, but a system of water works has been partially constructed.	Placarding and isolation always adopted in cases of infectious disease	D.—3. T.—1. S. F.—8.	Without sewers.		
Galt	Inspection of milk, offered for sale from time to time made.	Water supply at Central School found unfit for use, its discontinuence ordered.	A few cases of diphtheria, typhoid, scarlet fever and measles reported.	.....	The question of sewage called to the attention of Board.		

TOWNS.—*Continued.*

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses, etc.	Removal of Garbage and night soil.
Barrie	The milk supplied considered good. Vaccination neglected.	The water in some wells found impure. The wells in each case ordered to be filled up.	Typhoid epidemic due to impure water, caused by wells being too close to privy pits. Isolation, disenfection, etc. strictly enforced. Isolation hospital recommended	D.—14. T.—40. S. F.—7.	Drainage on an extensive scale carried on during the year.	Slaughter-houses thoroughly inspected. The keeping of swine in towns and villages ought not to be tolerated.	The emptying of privy pits and removal of garbage done under supervision of inspector. Privy pits to be abolished and dry earth closets to take their place.
Napanee	Sanitary inspector reports but few nuisances.	....	.....	A few cases of typhoid reported.			
West Toronto Junction	An inspection of schools and premises made by M. H. O.	A system of water supply as well as wells in use.	Placarding in infectious diseases in every instance.	D.—3. T.—2. S F.—1.	A system of sewerage under construction.	.....	A scavenger looks after the removal of garbage, etc.
Paris	No satisfactory inspection of the milk supply.	A system of water works in operation.	Isolation, etc., adopted to prevent spread of infectious diseases.	D.—12. T.—22. S. F.—A number of cases.	....	.....	Privy pits still in use.
Owen Sound	Inspection of milk made on two occasions.	.....	Placarding and isolation adopted to prevent spread of infectious diseases.	D.—17. T.—9. S. F.—16.	One drain constructed, and others needed.		
Walkerton	.....	M. H. O. recommend that water for drinking purposes be supplied from water works system.	Most of typhoid cases in low lying part of town, where cellars are damp.	D.—A few cases T.— " S. F.— "			
Simcoe	A general inspection of town by inspector.	.....	.....	.....	Some drains became offensive because of scarcity of water to flush them.	.....	All accumulations of garbage were removed promptly by citizens.

Peterboro'	Efficient house to house inspection was carried out during the year.	Water is found to be of varying degrees of purity according to location.	Isolation disinfection in infectious diseases.	D.—45. T.—18. S. F.—26.	A sewerage system for the town is taking a practical shape.	No trouble with slaughter-houses and pigs were kept outside of town.	The cost of the removal of garbage out of the general taxation is recommended. A large number of earth closets have been substituted for vaults.
Cobourg		Water supply good.	Isolation, placarding and disinfection in infectious diseases.	D.—4. T.—3. S. F.—30.	1,826 feet of drainage laid during the year.	Inspection of slaughter houses made.	
Milton	Secretary reports that special attention has been given to wells, drains, privy pits, etc.		A few cases of diphtheria and measles reported			A slaughter-house nuisance abated. Greater restrictions should be placed upon the keeping of hogs in towns.	
Seaforth	Any cases of unsanitary conditions were attended to.			D.—3. S. F.—2.			
Bowmanville	Sanitary condition excellent.		A few cases of typhoid.		Drainage of town good.		
Whitby	Sanitary enactments difficult to enforce because of apathy on part of Board.		Physicians neglect to report infectious diseases.	D.—2. S. F.—1.			
Almonte	An efficient inspection of town by sanitary inspector.		A few cases of infectious diseases				Arranging for the proper disposal of refuse of yards and privies the chief trouble.
Niagara Falls	The Simcoe street nuisance the only one giving trouble.		Free from infectious diseases.				
Walkerville	House to house inspections made during the year. Milk supply good.	Water supply from Detroit river.	School closed and other precautions taken to prevent spread of diphtheria.	D.—24. S. F.—1.		Some evils in connection with cattle byres were remedied.	Some water closets still exist without sewer connection.

TOWNS.—*Continued.*

——	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses, etc.	Removal of Garbage and night soil.
Collingwood			Placarding and disinfection in infectious diseases.	D.—5. T.—32. S. F.—10.			
Mt. Forest	The cleaning of yards, etc., is looked after each spring.		A few cases of diphtheria reported.		Better drainage for the town needed.		
Lindsay		Waterworks soon to be established.	Some cases of diphtheria occurred through want of isolation.	D.—11. T.—7. S. F.—3.	A system of sewerage needed.		
Listowel			A few cases of diphtheria, typhoid and scarlet fever.		Natural drainage not good.		The use of dry earth closets recommended by M. H. O. All garbage removed in the spring.
Brampton	Sanitary condition of town fair.			T.—2. S. F.—A few cases.			
Perth			Free from infectious diseases.			Slaughter-houses were removed from the built up parts of the town.	
Picton			Free from infectious diseases.				A nuisance in connection with a canning factory abated.
Meaford		Wells in too close proximity to privy pits	Most of the cases of diphtheria due	D.—60. S. F.—4.			Board is making exertions to do

		and as a consequence water impure.	to bad well water. Wells contaminated by privy pits. Placarding, isolation, disinfection and closing of schools to prevent spread of diphtheria.				away with privy pits and substitute earth closets.
Sandwich				D.—A few cases.	Sanitary condition of town much improved owing to recent drainage.		
Midland		Well at one school cleaned.	Isolation carried out in infectious diseases.	D.—8. T.—15. S. F.—10.	Street drains in a good condition.		Privy pits cleaned by emptying out contents. Dry earth closets recommended.
Port Arthur	M. H. O. recommends the building of a hospital for infectious diseases.	M. H. O. points out need for a system of water works.	Strict isolation and placarding adopted in infectious diseases.	D.—2.	An open drain requiring attention reported by M. H. O.		The inspector ordered the removal of all garbage, etc.
Trenton	Sanitary Inspector made an inspection of all slaughter-houses, bake shops and provisions offered for sale.	Water at one of the schools analysed. The cutting of ice under direction of M. H. O.	Placarding, etc, and notification of school teachers in infectious diseases cases.	D.—34. S. F.—4.	A system of sewerage and water supply needed.	Some complaints made regarding pig pens.	M. H. O. recommends use of dry earth closets.
Kincardine			Free from infectious diseases.			Slaughter-houses not kept in a desirable condition.	Dry earth closets recommended.
Windsor	A sanitary inspector appointed to devote his time to inspection and abatement of nuisances. No milk inspection carried on this year.	Pollution of water supply has increased somewhat. 63 wells were closed up.	Infectious diseases controlled by notification disinfection and isolation.	D.—12. T.—6. S. F.—6.	7,000 feet of sewers built during year.	One stable nuisance reported.	Privy vaults in too close proxinity to dwelling condemned by M. H. O.
Goderich	Secretary reports the year as an exceptional one.			S. F. 1.			

VILLAGES.

——	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria. Typhoid. Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Watford	The careless ones have been made keep their premises in a proper condition.	Soil being clay, wells are not in danger of being contaminated by soakage from privies etc.	A few cases of typhoid and diphtheria. Isolation in above diseases.	.....	A defective sewer the cause of typhoid. One drain has caused some trouble.		
Merritton	.....	Supplied with water from Lake Erie.	Disinfection etc., used to prevent spread of infectious diseases.	D.—3 T.—1.			
Oakville.....	The health of town unusually good during year.	....	The Board exercises the utmost vigilance to prevent spread of infectious diseases.	D.—4. S. F.—3.			
Oil Springs.....	.....	The water in wells in portion of village condemned and largely responsible for the typhoid fever.	Typhoid epidemic, scarlet fever prevalent, and in many cases the fact was concealed to prevent placarding, and these cases mingling with public a source of communication.				
Richmond	Sanitary conditions of village good.	.....	Precautions taken to prevent spread of diseases.	D.—1. S. F.—2.			
Fenelon Falls	House to house inspection made	Sufficient care has not been taken to exclude surface water from wells, hence many are impure.	Free from infectious diseases.	T.—1.	.....	.....	A nuisance exists in the form of a stench from a pulp mill.
Tilsonburg	The residents assist in keeping town in a sanitary condition.	....	A few isolated cases of typhoid which were carefully looked after.				

Fergus	Sanitary inspector caused all nuisances to be abated.			Isolation etc., in diphtheria cases.	D.—3. S. F.—1.					
Port Colborne	Village in a healthy condition.			Physicians report punctually cases of infectious diseases, and Secty sees that houses placarded at once.	T.—2.					
Morrisburgh	Sanitary condition of village good.			A few cases of measles and scarlet fever.						
Deseronto	Two inspections of village made during year.			A few cases of typhoid fever.						
Minden	Sanitary condition of village satisfactory.			Isolation in infectious diseases.	D.—1.					
Alexandria	Two complaints of premises in unsanitary condition, which were remedied.			The typhoid and scarlet fever attributed to stagnant water of mill pond.	T.—10. S. F.—A few cases.					
St. Catharines	House to house inspection made.			With exception of typhoid, free from other infectious diseases.	T.—2.					
Arnprior	Some complaints re unsanitary premises were remedied.			Free from infectious diseases.						
Uxbridge	An inspection of village made by Sanitary Inspector.			Typhoid due it is thought to prolonged dry weather.	T. 25.					
Elora	Sanitary condition of village excellent, no nuisances reported.			Free from infectious diseases.						
Preston	An analysis of the milk sold was made and found satisfactory.	M. H. O. suggests that a rigid inspection of all wells be made.		Placarding, disinfection and isolation carried out in infectious diseases.	D.—12. T.—9. S. F.—6.					

VILLAGES.—*Continued.*

	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Beaverton	Sanitary condition of village satisfactory.		Some difficulty was experienced in enforcing placarding.	D.—1. T.—A few cases.			
Point Edward	Notices were sent to each householder *re* the cleaning of their yards.		Placarding, isolation and disinfection in infectious diseases.	D.—7. S. F.—3.			
Glencoe		Water in wells made unfit for use because of flooding of yards by heavy rains.	Several cases of typhoid reported.				The Secretary hopes that yards and closets will receive special attention.
Newburgh	The people readily comply with regulations of Sanitary Inspector.		Free from infectious diseases.				
Streetsville	House to house inspection made.			D.—2. T.—2.	Attention of the Council called to need of improving the drainage.	The keeping of pigs in villages ought to be discouraged.	
Chesley	All yards etc., kept clean.		Has been free from infectious diseases.		Is well drained.		No garbage allowed to accumulate.
Milverton			Free from infectious diseases			The slaughtering of animals prohibited within village.	
Lakefield	A thorough inspection of village by Inspector.		If first case of scarlet fever had been reported, second would not likely have occured.	D.—2. T.—6. S. F.—2.		Slaughter houses are kept outside of village, but pigs are still allowed inside.	

Wiarton	House to house inspection made.	An extension of supply pipe into deeper water needed to insure pure water.		D.—2. T.—1.	A system of sewerage recommended by M. H. O.	Slaughter houses removed outside corporation limits.	A scavenger appointed to look after removal of garbage etc.
Bracebridge		The water of some wells found impure.	Impure well water the cause no doubt of some cases of typhoid.	D.—3. T.—A number of cases.			
Niagara Falls	House to house inspection made by Sanitary Inspector.		Free from infectious diseases.				
Forest			A few cases of diphtheria and scarlet fever.			M. H. O. urges the removal of cowbyres beyond limits of village.	M. H. O. advises that it be made compulsory to have all privies cleaned twice a year, and public outhouses disinfected once a month.
Sterling	Thorough inspection of village by Sanitary Inspector.		Free from infectious diseases.				
Embro	Some minor nuisances abated during the year.	Some wells received a thorough cleaning.	M. H. O. has great faith in placarding as a means of securing isolation in infectious diseases.	S. F.—8.			
Norwich		The proper flushing of water tanks for fire purposes neglected.		T.—1.	The proper drainage of a stagnant pond made.	Periodical inspection of slaughter houses was made.	M. H. O. recommends use of dry earth closets,
Brussels	All yards etc., were regularly inspected.			T.—1. S. F.—A few cases.			
Beamsville	A number of complaints satisfactorily dealt with.		Placarding notices sent to school teachers in cases of infectious diseases.	S. F.—3.			
Vienna	Sanitary condition of village good.		A few cases of whooping cough.				

VILLAGES.—*Continued.*

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Teeswater			Free from infectious diseases.				Several complaints *re* water-closets.
Exeter	All householders were notified to put their premises in a sanitary condition.			S. F. 1.			
Dunnville	House to house inspection carried out.			D.—1. T.—1. S. F.—5.			
Beaverton	A thorough inspection of all back yards and premises made.		Defective drain the cause of typhoid case.	T.—1.			Privy vaults replaced with dry earth closets.
Colborne			Isolation and disinfection used in infectious diseases.	D.—1.			
Thedford	The sanitary inspector performed his duties efficiently.			D.—A few cases. T.—4.			
Port Perry	Secretary reports the year as healthy.			D.—2. T.—3. S. F,—1.			
Blyth	Sanitary inspector is diligent in his duties.		A few cases of typhoid fever.		Special attention is given to dramage.		
Millbrook	Sanitary condition of village good.		Isolation and disinfection in infections diseases.	D.—2. T.—2.			
Newcastle	A thorough inspection of village made.	The water in all wells found satisfactory.		D.—2. T.—3.			

TOWNSHIPS.

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Mariposa	Inspection of all villages made.	Water supply in some school sections neglected.	One cheese factory nuisance abated.	Placarding in all cases.	D.—1. T.—5. S. F.—3.		
Oro				A few diphtheria cases reported.	D.—10.		
Seneca		Wells in some parts uncleaned.		Diphtheria and typhoid more prevalent than last year.		Bad drainage cause of diphtheria, etc.	S. H. inspected pig-pens too near to dwellings.
Garafraxa, West	A nuisance in the form of a filthy conditioned house removed. Inspection of school houses and premises.	Cleaning of wells once a year recommended. Wells of school found in good condition.		Typhoid appearing in undrained parts of township.			One slaughter-house found unsatisfactory.
Downie		Water supply of schools looked after.		Free from infectious diseases.			
Hibbert	Inspection of school houses made.			A few cases of infectious diseases reported.			Hog cholera occurred in early part of year.
Clarke	Inspection of school houses made.		Cheese factories inspected and found in fairly good condition.	A few cases of diphtheria only.	D.—3.		
Sullivan	School houses and premises were inspected.			Isolation in infectious diseases always carried out.	D.—1.		
Woolwich				An epidemic of diphtheria reported with six deaths.			Complaint made of a number of carcasses left unburied.

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Sydenham				Cases of diphtheria, typhoid and scarlet fever reported.	T.—8. D.—7. S. F.—A number.	Drainage in village of Leith recommended.	
Humberstone	Nuisances abated by order of inspector.		Kept in good condition.	Measles and la grippe prevalent.	D.—2.		
Dereham	Inspection of township by sanitary inspector.	Backwardness on part of majority of population to have wells cleaned out.		A few cases of diphtheria and typhoid.			
Wainfleet					D.—3. T.—2.	A great deal of drainage done, hence very little stagnant water.	Dairies and pig-pens need attention.
Emily	Calls the attention of Board to the necessity of supplying physicians with blank forms to report infections diseases.			Isolation adopted in infectious diseases.	D.—2. S. F.—4.		
Maryboro	Vaccination neglected.				T.—1.	A drain without a proper outlet reported.	
Innisfil				A few cases of diphtheria and scarlet fever reported.			
Gloucester				Strict insolation adopted in infectious diseases.	D.—A few cases. S. F.—A few cases.		No complaints regarding slaughter-houses.

Southwold				Isolation adopted in infectious diseases.	T.—5. S. F.—A number of cases.		
Sarawak	School privy vaults found to be in a filthy condition by inspector.			Free from infectious diseases.			
South East Hope		All School Boards were requested to have wells at their respective schools cleared out at summer vacation.		A few cases of scarlet fever.			All owners of cider mills were notified to remove all offal in connection with their presses.
Elma				A few cases of diphtheria reported.		The increased drainage throughout township is lessening cause of disease.	Owners of slaughter houses were notified to keep their places as the law directs.
Glanford	Secretary furnished physicians with blank forms *re* reporting of infectious diseases.			Physicians have neglected to make return of infectious diseases.	D.—1. T.—3.		
Dysart	No nuisances reported during year.	The water supply good.		Free from infectious diseases.			
Hallowell					S. F.—42.		
Osprey	M. H. O. recommends schools and their outbuildings should be yearly inspected. More general vaccination of pupils attending school.	An adequate supply at all times of the year.		A few cases of scarlet fever and one case of typhoid. Neglect shown on part of physicians to report infectious diseases.		Good natural drainage.	
Manvers				In the opinion of the M. H. O. five cases of diphtheria were caused by bad well water.	D.—32. S. F.—2.		

TOWNSHIPS.—*Continued.*

——	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Flamboro, East	Greater precautions are taken *re* the prevention of disease than heretofore.	....	.....	A few cases of measles, mumps and whooping-cough.			
Chaffey	M. H. O. draws attention to the Act *re* the appointment of M. H. O's. in unorganised townships.	....	....	Free from infectious diseases during the year.			
Scott	The township has been free from nuisances during the year.	.....	.....	The severe drought causing lowness of well and spring waters the probable cause of typhoid.	D.—4. T.—A number of cases.		
Thorold	One Complaint made to the Board during the year.	.....	....	A few cases of diphtheria and whooping-cough reported.			
Cartwright	....	....	... .	Isolation and placarding adopted in infectious diseases.	D.—4. S. F.—1.		
Louth	Better ventilation of school houses recommended by M. H. O.	The M. H. O. points out the importance of a pure water supply at schools.	....	Every precaution taken to prevent spread of infectious diseases.	T.—1.	... .	A frequent cleaning of piggeries and privy pits should be insisted upon.
Hullett	No nuisances reported.	....	.....	.....	T.—1. S. F.—A few cases.		

Brooke			Inspection of cheese factories in township.	A few cases of typhoid and scarlatina.		Complaint made re stagnant water along track of railway.	The condition of slaughter-houses better than in former years, owing to inspection.
Tiny		Water supply the cause of two of the cases of typhoid.		Diphtheria and typhoid epidemic, isolation, disinfection and placarding adopted to prevent spread	D.—20. T.—24.		
Murray		The water supply generally responsible for typhoid.	Cheese factories should be inspected.	Reports, neglect on part of physicians in reporting infectious diseases.	D.—3. T.—1.		A thorough inspection should be made.
Erin		Well at one school closed because of impurity of water.		A few cases of scarlet fever and measles.			One pig-pen nuisance abated.
Blenheim	Inspection of school premises and grounds made.				T.—2.		Slaughter houses removed from immediate neighbourhood of village and kept in good condition.
Saugeen				A few cases of typhoid and diphtheria reported, isolation and disinfection carried out to prevent spread.			Two slaughter-houses complained of put in a sanitary condition.
Turnberry			One cheese factory, pig-pen reported a nuisance.	M. H. O. observes that the law should be better complied with re the reporting of infectious diseases.			One pig-pen and slaughter-house nuisance reported and abated.
Logan	Sanitary condition of township good.			A few cases of diphtheria and scarlet fever.			

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Mornington	Some diseased cattle looked after by government inspector.				D.—A few cases. T.—1.		
Grimsby, South	Eight cases of nuisances reported to inspector and satisfactorily disposed of.			Measles and mumps prevalent.			
Guelph	A house containing diphtheria patients reported unfit for habitation and removed.	One well with impure water at school-house reported.		A few cases of diphtheria.			Some cattle sheds put in proper condition.
Caledon	Burying ground in Alton village too centrally situated. Soil being porous there is danger to public health.	In parts of township impure because of pollution of streams and wells.		Typhoid due to impure water. Some cases of scarlet fever reported. Diphtheria reported due to damp cellars and decaying vegetable matter.	T.—23.		A number of hog-pen nuisances dealt with.
Sandwich, East					D.—3. S. F.—1.		
Nichol				Placarding in infectious diseases.	T.—6. S. F.—A number.		
Wallace	An inspection of all schools and grounds recommended. No systematic vaccination practised.	No report as to the purity of drinking water supplied to schools.		A few cases of diphtheria.			
Ancaster					D.—2. T.—3. S. F.—3.		All slaughter-houses, etc., inspected by M. H. O. and San. Inspector.

Aldborough				The law *re* reporting of infectious diseases on part of physicians not at all complied with.	T.—2.		
Whitchurch				Board did not consider it necessary to take any action to prevent spread of contagious diseases.	D. 7. T.—Several cases.		
Goderich		A plentiful supply of pure water at all the schools.		No cases of infectious diseases reported.			
Ameliasburgh				Diphtheria and scarlet fever prevalent. School closed to prevent spread.	D.—Many cases. S. F.—100.		
Minto				A few cases of diphtheria.			One slaughter-house complained of.
Yarmouth	All school premises put in a sanitary condition.						Slaughter-houses inspected.
Wellesley		Impurity of water supply the cause of a case of typhoid.		The holding of funerals in diphtheria and like diseases to be discouraged.	D. Number of cases. T.—3.		A conviction secured in a case in which an animal suffering from actinomycosis was offered for sale.
York	Inspection of township made regularly by Inspectors.	The water supply of some schools not considered pure.		Diphtheria epidemic at Braeondale. Apathy on part of physicians to prevent spread of disease reported. Also cases in other parts of township.		Complaint made *re* the draining of slop water from Hillcrest Home in an open ditch.	Slaughter-houses and pig-pens kept in satisfactory condition

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Gwillimbury, East					D. 8. T. 12. S. F.—2.		Committee of Bd. appointed to look after slaughter-houses.
Bruce				Precautions to prevent spread of diphtheria, etc., were taken, such as notification of school trustees and teachers.	D.—A number of cases. T.—12. S. F.—A number of cases.		
Orillia	Sanitary condition of township good.			One case of glanders in a horse, which was killed and buried.	D.—1.		
Crowland				Measles were prevalent.	T.—1.	More attention given to drainage by farmers than in former years.	
Stamford	School grounds have been inspected.		Those in charge of dairies have kept them in good condition.	Placarding in infections diseases.	D.—3. S. F. 3.		Slaughter-houses kept in good order.
Beverly				Placarding in infectious diseases adopted.	T.—1. S. F.—4.		
Maidstone	Supervision on part of Board of township efficient.			A few cases of diphtheria and typhoid.		An excellent system of drainage in operation.	
Metcalfe				Infections diseases to be promptly reported by physicians.	T.—1. S. F.—A few cases.	Extensive drainage operations carried on during the year by council.	

Euphrasia	M. H. O. notified a School Board to close school in *re* diphtheria cases. Trustees ignored notice.			Neglect on part of physicians to report infectious diseases. Isolation disinfection used to prevent spread; also placarding.	D.—19. S. F.—50.		
Flamboro', West	A careful inspection made of all school premises.		Twenty dairymen granted permits.	Free from infectious diseases.			Slaughter-houses inspected, and permits to 12 butchers granted.
Sunnidale	Ventilation and lighting of some schools defective.	Drinking water; from wells.		One case of typhoid and a few cases of scarlatina.			
Esquesing		West branch of river Credit polluted by washings from Acton tannery.			D.—1. T.—A few cases.		
Kinloss				Measles and whooping cough prevalent in early part of year.	T—3.		One slaughter-house nuisance abated.
Reach				Physicians careless about reporting infectious diseases in their practice.	D.—6. T.—2.		
Toronto		Water at one school impure because of well being too near to a filthy privy vault. Diphtheria prevalent at said school.		Decaying animal and vegetable matter the principal cause of scarlet fever.	D.—8. T.—6 S. F.—19.		Many of the slaughter-houses are not at the prescribed distance from roads and dwellings.
Burford					D.—3. T.—2. S. F.—2.		

TOWNSHIPS.—*Continued.*

	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
East Luther.....	.....	.....	.....	A number of cases of diphtheria and typhoid. Isolation adopted to prevent spread.	.....	Some swamp lands need draining badly, the diphtheria cases being in the neighbourhood of these lands.	
Dumfries, North.....	Inspection of the premises of those supplying milk to villages made.	Local Board drew the attention of trustees to the necessity of a pure water supply for schools.	Cheese factories inspected.	Physicians do not report infectious diseases as promptly as they should.	D.—2. T.—3.		Slaughter-houses inspected.
Hawkesbury, West ...	The sanitary inspector made a tour of inspection.	.....	.....	Isolation and placarding in infectious diseases.	D.—6. S. F.—14.	Some stagnant water in village of Hawkesbury needs attention.	
Hope	Complaints *re* deposits and garbage on lake shore made.	Water supply pure....	.....	Free from infectious diseases.	.....	Good natural drainage.	Slaughter-houses regularly inspected.
McKillop	Some cases of tubercular disease existed among cattle, but the rigid inspection proposed will stamp it out.	.....	.....	Remarkably free from infectious diseases.	.....	.....	A nuisance in the form of a pig-pen in connection with a cheese factory was remedied. Other cases of nuisances abated.

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NINTH ANNUAL REPORT

OF THE

INSPECTOR OF LEGAL OFFICES

FOR THE

PROVINCE OF ONTARIO

BEING FOR THE YEAR

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT ST. WEST.
1892.

ANNUAL REPORT

OF THE

INSPECTOR OF LEGAL OFFICES.

Osgoode Hall, Toronto,
4th April, 1892.

The Honourable O. Mowat,
Attorney-General, etc.

Sir,—I have the honour to present my Ninth Annual Report on the inspection of the County Judicial Officers throughout the Province for the year ending the 31st December, 1891.

During the year the following officers were appointed, namely :—

Sheriffs.—W. Watt, Jr, Esquire, Sheriff of Brant, appointed on the 25th April, 1892, in the room and stead of W. J. Scarfe, Esquire, deceased ; James Brady, Esquire, appointed on the 28th March. 1891, to be Sheriff in the room and stead of George Perry, Esquire, deceased ; Wm. Moffatt, Esquire, appointed on the 18th July, to be Sheriff in and for the County of Renfrew, in the room and stead of W. Murray, who succeeded the late James Morris, on the 24th January, 1891, and subsequently resigned.

Local Masters.—A. H. Clarke, Esquire, appointed on the 3rd October, 1891, to be Local Master and Deputy Registrar at the Town of Windsor, in the County of Essex, *pro tempore*, in consequence of the illness of S. S. Macdonell, Esquire; His Honour Judge Kingsmill, appointed on the 19th December, 1891, to be Local Master at the town of Milton, in the county of Halton, *pro tempore*, in consequence of the death of His Honour Judge Miller.

County Attorney and Clerk of the Peace.—J. L. Whiting, Esquire, appointed on the 3rd October, to be County Crown Attorney and Clerk of the Peace, in

and for the said County of Frontenac, in the room and stead of B. M. Britton, Esquire, appointed referee under the Drainage Act.

Local Registrar.—J. A. McDougall, Esquire, appointed on the 13th July, 1891, to be Local Registrar of the High Court and Clerk of the County Court, in and for the United Counties of Stormont, Dundas and Glengarry, in the room and stead of A. E. McDonald, Esquire, deceased.

Surrogate Registrar.—On the death of D. D'Everado, Esquire, Surrogate Registrar of Welland, on the 4th July, 1891, I. P. Wilson, Esquire, Local Registrar, became Surrogate Registrar pursuant to Sec. 9 of the Surrogate Courts Act.

Sheriff's Offices.

The duties of these offices were performed very satisfactorily during the past year. Moneys collected have been, with very few exceptions, paid over promptly. No overcharges were found to have been made intentionally, and these that I discovered were of trifling amount. Carelessness in making proper entries in execution and cash books still continues in several offices, necessitating an annual audit of the accounts in order to prevent confusion and loss.

Much dissatisfaction exists among the officers with reference to interpleader costs and in executing writs of *Fi. Fa.* where defendant not served by sheriff with writ of summons. Where a sheriff seizes goods in the possession of a judgment debtor and a claim is made by a claimant who afterwards proves to be worthless, the sheriff's costs occasioned by the making of such claim are lost to him without any redress. Another grievance is with respect to executions received by sheriffs against worthless debtors, in cases where the writ of summons has not been served by the sheriff; when the sheriff receives the writ of *Fi. Fa.* he has to travel a number of miles to execute it, and in a number of cases finds that the debtor has no goods liable to seizure. In such cases the sheriff has to bear the loss of mileage in travelling and the wages of his bailiff, as he is not allowed anything unless he makes the money. These are grievances which should be remedied by rules of Court.

I have set forth in appendix "A," in tabulated form statistical returns made by all the sheriffs for the past year ending 31st December, 1891.

Local Masters.

The business of these offices has fallen off during the past few years, principally in consequence of legislation in the interests of litigants. As an instance, the Devolution of Estates Act has interfered to a considerable extent with the administration of estates in the Master's office; this Act has, however, been the

means of a large saving to infants and others in the way of legal expenses incurred in winding up estates of intestates by the Courts. One result of such changes in the law is to reduce the income of these officers and in consequence the Masters, whose fees were commuted some years ago, do not now earn or receive as much fees as equal the amounts for which they commuted their fees. The duties of the offices during the past year have been performed without complaint of any kind, although in two or three offices the entries in the Master's dockets have not been promptly made; delays in issuing reports are also too numerous in one or two offices. The charges made by the officers were correctly made, although the stamps representing same were not collected in some cases.

The statistical returns of the business done by the Local Masters for the past year appear in appendix "B."

Local Registrars, Deputy Registrars, Deputy Clerks of the Crown and County Court Clerks.

For years a difficulty was occasioned in local offices by reason of a want of uniformity in procedure existing in the head offices. In order as far as possible to remove this, the Registrars of the three divisions of the High Court agreed to certain domestic regulations which were approved by the Judges of the High Court of Justice on the 26th February, 1891. These regulations are as follows:

1. All judgments to be given out after entry; all judgments to be entered in the office where the appearance is required to be entered.

2. All orders to be charged for as special, except such as are issued on præcipe, and the fees payable on such special orders, to be set out in the Tariff, namely twenty cents by Statute and twenty cents a folio up to six folios, and no more than six folios to be charged for, exclusive of charge for entering.

3. On giving out any papers to parties entitled thereto, in pursuance of an order or otherwise, no search to be charged. Order and receipt to be charged for as separate fylings.

4. Certificates for registration to be issued on fyling a proper præcipe and production of original or office copy of order, or judgment; no copy of order or judgment need be fyled.

5. Copying ordered from any office, when the pressure of business in such office will not allow of such copying being done therein in sufficient time, is to be done in the office of the Clerk of the Records and Writs (see Order-in-Council dated 3rd April, 1884); all copying to be paid for in stamps at the rate of 10c. per folio.

6. All forms to be used in the offices of the Registrars, and Clerk of Records and Writs, to be furnished by the Clerk of the Process.

7. Affidavits fyled on application before Judgment Clerks in actions in Q.B. or C.P. Divisions to be forwarded by them to the officer in whose office the action is pending.

8. Rule 28 (*d*) is to be acted on as though the Registrar of the Chancery Division or the Assistant Registrar was named therein as well as the Clerk of Assize.

9. Amendments under Rules 424 and 444 to be made on fyling præcipe only

10. The Registrars of the High Court of Justice for Ontario, pursuant to Rule 450 of the Judicature Act for Ontario, hereby prescribe that all Rolls (Judgments) and Records, written or printed (either by typewriter or otherwise), shall be the length and width of a half sheet of foolscap paper, and shall be folded in half length-wise, and it is recommended that all records for trial shall be enclosed or covered by a full sheet of foolscap or other covering of the same size.

11. Rule 545. All appeals to a Judge in Chambers in Q.B. and C.P. Divisions to be sent down with the Clerk in Chambers and a fee of 50c. paid therefor.

12. Præcipe orders under Rule 622 may be issued at any time by the officer with whom the pleadings have been fyled, except for the purpose of issuing execution under Rule 886, in which case special leave is necessary, such order to be entered in full under Rule 774.

13 Rule 1226. Orders for delivery of bills of costs to be granted as of course.

Immediately upon the adoption of the above they were printed and copies sent to each of the officers.

In inspecting the various offices I discovered that taxations were attended to better than formerly, as also the collection of law stamps, although in some offices there was still room for improvement.

Some of the County Court Clerks have been in the habit of receiving chattel mortgages for filing with a request to fill in the date of filing and the number of such filing on a blank postal card enclosed, and for doing this they charged a fee of 50 cents as for a certificate. There is no authority for this charge, and I accordingly instructed such of the Clerks whom I found making such charges as to the illegality of same.

No complaints were made during the year as to any illegal charge. I was pleased to find that the work of these officers was faithfully and honestly performed with the exception as to the collection of law stamps in one or two offices which was not as satisfactory as it could be.

In appendices "C" and "D" are set forth the statistical returns of business received from these officers for the year ending 31st December, 1891.

Surrogate Registrars.

During my inspections I found that in some of the offices the stamps had not been collected for fees for the Judge and fee fund; I required stamps to be produced and cancelled in all these cases; these amounted to about $300.00.

During the year the Board of County Judges have revised, altered and amended the rules, forms, tariff of fees and costs under section 76 of the Surrogate Courts Act, and submitted the same to the Judges of the Supreme Court of Judicature of Ontario for their approval, and they were on the 8th of February, 1892, approved by these Judges. The principal changes were made by adding rules respecting contentious business, in applying the general rules which govern in the offices of the Masters of the Supreme Court of Judicature of Ontario, in the passing of executors' accounts, and in amending the rules and forms to correspond with the Devolution of Estates Act and the different statutes amending the Surrogate Courts Act.

I found in my inspections that in some places the Judge invariably made an order for an inventory to be filed within 3, 6 or 12 months, and for such order the Registrar collected 50c. for himself and 50c. for the Judge. In order to prevent this charge being made without good reason the Judges have, in the new rules (rule 19), provided that executors and administrators shall within 18 months after grant made, exhibit under oath an inventory of the estate. Hereafter there will be no charge made or collected for an order for inventory unless a special order is applied for by some party interested. The charges made and collected are now much more uniform than they have ever been in the past, and with the exception of the non-production of the law stamps in three offices, to a considerable extent the offices were found to be well carried on.

I have in appendix "E" set forth the statistical returns of business of these officers for the past year.

County Attorneys and Clerks of the Peace.

The returns of the Justices of the Peace are now entered in books of record by the Clerks of the Peace with two exceptions, and directions have been given in these two cases to comply with the statute.

I have again to report that the County Attorneys as law stamp distributors in a number of instances neglect keeping on hand a sufficient number of stamps for use of practitioners within their counties. I have instructed such officers to keep a full supply on hand in order to prevent inconvenience, delay and loss which would otherwise ensue, and I have no doubt these instructions will be carried out in the future.

In all the counties I find that the schedules of convictions by Justices of the Peace are printed in the public newspapers in a much more economical manner than heretofore, my instructions in this respect having been carried out, the counties receiving the benefit.

During the year I have settled a number of questions of charges between these officers and their Boards of Audit. I find that the allowances and disallowances made by the various Boards of Audit throughout the Province are quite different.

In appendix "F" I have set forth a schedule containing a return of all fees and emoluments earned and received and disbursements made by all the abovenamed officers for the past year, and have also set forth the average gross earnings and net income of each officer for the past five years.

The sufficiency of the security required to be given by all officers under my inspection has been inquired into, and where necessary new covenants or bonds have been given.

I have the honor to be,

Sir,

Your most obedient servant,

JOHN WINCHESTER,
Inspector.

APPENDICES.

APPENDIX A.—Containing in Tabulated Form Statistics as returned by the

COUNTIES OR DISTRICTS.	NUMBER OF SERVICES OF WRITS OF—						MISCELLANEOUS PROCESS SERVED.	
	Summons.		Subpœna.		*Ca Re & Ca Sa.*			
	H.C.J.	C.C.	H.C.J.	C.C.	H.C.J.	C.C.	H.C.J.	C. C.
Algoma	16	18	4	8	.....	.....	10	20
Brant	34	37	13	44	1	1	2	.....
Bruce	42	16	28	55	.....	.....	37	2
Carleton	143	84	62	29	.....	.....	182	139
Dufferin	35	15	3	.....	24	2	.....	.....
Elgin	23	42	6	.....	2	.....	20	2
Essex	50	34	65	120	1	4	11	3
Frontenac	36	18	5	1	.....	.....	.....	.....
Grey	50	17	15	14	1	1	1	2
Haldimand	22	2	22	32	1	.....	4	.....
Halton	27	18	6	.....	.....	.....	15	2
Hastings	43	23	28	27	.....	.....	11	1
Huron	38	19	15	37	.....	1	3	9
Kent	65	46	44	21	.....	.....	22	6
Lambton	27	30	15	44	.....	.....	22	6
Lanark	33	6	2	4	.....	.....	9	4
Leeds and Grenville	37	28	18	11	1	1	8	14
Lennox and Addington	28	10	13	.....	.....	1	15	1
Lincoln	54	17	24	11	1	.....	17	.....
Middlesex	45	28	19	72	2	1	8	14
Muskoka	19	14	.....	64	.....	.....	.....	4
Norfolk	17	9	.....	106	.....	1	7	5
Northumberland and Durham	54	24	21	26	1	.....	19	5
Ontario	46	24	7	14	.....	.....	5	7
Oxford	64	55	14	104	.....	1	21	12
Parry Sound	7	11	.....	7	.....	.....	.....	.....
Peel	33	10	13	16	.....	.....	24	2
Perth	42	13	19	14	.....	1	11	2
Peterborough	43	28	8	1	.....	.....	11	8
Prescott and Russell	51	18	8	.....	.....	.....	4	2
Prince Edward	24	6	10	5	.....	.....	7	4
Rainy River	6	10	4	20	.....	.....	6	3
Renfrew	26	29	2	.....	.....	1	3	4
Simcoe	55	51	8	21	1	.....	25	9
Stormont, Dundas and Glengarry	46	28	8	.....	.....	1	14	1
Toronto	509	273	175	17	2	7	183	29
Thunder Bay	20	15	7	7	1	1	20	8
Victoria	45	16	2	.....	.....	.....	20	2
Waterloo	62	20	5	5	9	.....	26	2
Welland	37	20	13	15	.....	.....	12	1
Wellington	27	17	12	36	.....	.....	10	5
Wentworth	67	29	6	.....	4	1	13	4
York	98	52	16	92	1	2	47	24
Totals	2246	1280	765	1100	53	28	885	371

different Sheriffs for the year ending 31st December, 1891.

Total Number of Services.	Number of Estreats Received.		Number of Writs of Execution.				Number of Writs of Renewal Received.			
			(1) Against goods.		(2) Against lands.		(1) Against goods.		(2) Against lands.	
	H.C.J.	C. C.	H.C.J.	C. C.	H.C.J.	C. C.	H.C.J.	C. C.	H.C.J.	C. C.
76	.....	.....	31	55	29	48	8	17	19	33
132	.....	.....	31	36	25	28	5	6	7	12
180	.....	2	35	52	26	39	8	2	26	66
639	1	.....	88	91	62	68	34	19	38	23
79	.. ....	.....	15	37	12	30	7	15	8	24
95	.....	.....	38	42	29	42	11	13	29	14
288	.. ..	.....	37	88	24	80	3	3	8	8
60	.....	.....	25	34	25	22	1	.....	.....	.....
101	.....	.....	31	66	27	63	6	28	13	92
83	.....	.....	10	11	7	9	3	.....	3	1
68	.....	.....	21	43	17	34	7	13	2	5
133	.....	1	66	62	44	49	49	43	51	65
122	.....	....	34	46	18	41	20	30	34	57
204	.....	.....	51	151	40	147	16	18	30	47
144	.....	.....	53	89	40	94	15	42	24	82
58	1	.....	19	28	20	25	3	6	4	6
118	.....	....	31	44	10	26	5	16	16	34
71	.....	.....	14	24	10	21	10	15	10	17
124	1	.....	24	34	15	30	19	16	15	23
189	.....	.....	55	92	51	88	17	21	22	47
101	. . ..	.....	9	10	8	10	3	4	4	7
145	.....	1	16	25	7	27	3	9	6	10
150	1	... .	61	76	43	71	31	42	29	71
103	.. ....	6	28	41	22	32	10	11	19	40
271	.. ....	.....	40	56	27	44	9	8	10	9
25	.....	.....	17	16	11	18	3	5	6	7
98	.....	.....	23	25	15	21	5	4	14	16
102	.....	.....	39	53	29	37	9	10	9	17
99	.....	.....	27	46	13	34	4	20	4	25
83	.....	.....	27	50	21	44	4	17	11	41
56	.....	.....	15	14	9	9	6	10	9	16
49	.....	.....	2	7	2	9	.....	1	.....	.....
65	.....	.....	30	46	22	41	9	6	6	8
170	....	.....	52	112	44	111	10	5	55	80
98	.....	.....	42	68	34	64	20	40	24	70
1195	3	.....	457	515	364	431	58	44	215	230
79	.....	....	15	41	15	41	4	19	13	28
85	.....	.....	23	27	16	26	11	24	13	45
129	.....	.....	13	54	10	45	1	2	2	11
98	.....	.....	22	37	20	33	16	25	19	36
107	.. ....	.....	40	63	25	67	18	26	28	43
124	1	.....	67	73	49	58	28	36	47	55
332	.....	1	117	144	110	146	7	4	107	115
6728	8	11	1891	2727	1447	2403	516	695	1009	1636

APPENDIX A.—Containing in Tabulated Form Statistics as returned by the

COUNTIES OR DISTRICTS.	NUMBER OF SALES UNDER WRITS OF EXECUTION.				Number of cases entered under the Creditors' Relief Act.	Number of Certificates received under this Act.	Assignments to Sheriffs under R. S. O. 1887, Cap. 124.
	(1) Against goods.		(2) Against lands.				
	H.C.J.	C. C.	H.C.J.	C. C.			
Algoma	2	3	1	1	6	.....	1
Brant	3	.....	1	.....	2	.....	2
Bruce	2	4	1	2	6	8	2
Carleton	4	2	2	.....	5	2	.....
Dufferin	.....	.....	.....	1	1	.....	1
Elgin	4	2	.....	1	8	1	1
Essex	.....	3	.....	1	3	25	4
Frontenac	2	.....	.....	2	1	.....	1
Grey	2	8	.....	1	18	3	.....
Haldimand	3	.....	.....	.....	.....	.....	.....
Halton	.....	2	.....	2	2	9	.....
Hastings	8	3	2	.....	7	11	6
Huron	.....	1	1	1	3	.....	7
Kent	9	79	1	8	7	59	1
Lambton	2	2	.....	1	4	9	5
Lanark	1	.....	.....	.....	1	.....	1
Leeds and Grenville	4	4	.....	1	9	22	6
Lennox and Addington	.....	.....	.....	.....	1	8	3
Lincoln	5	1	1	.....	6	1	1
Middlesex	4	2	1	.....	9	4	.....
Muskoka	.....	1	.....	.....	1	1	.....
Norfolk	3	2	.....	2	4	2	.....
Northumberland and Durham	4	6	1	1	5	.....	1
Ontario	1	.....	2	.....	3	.....	2
Oxford	2	3	2	.....	6	5	.....
Parry Sound	2	2	.....	.....	1	.....	3
Peel	1	1	.....	1	3	1	.....
Perth	6	3	.....	.....	9	1	.....
Peterborough	2	1	.....	.....	3	2	.....
Prescott and Russell	.....	.....	.....	1	1	3	3
Prince Edward	3	2	1	1	6	6	3
Rainy River	.....	1	.....	.....	1	1	1
Renfrew	4	6	.....	1	2	3	.....
Simcoe	2	3	2	2	6	3	1
Stormont, Dundas and Glengarry	3	2	1	3	8	1	10
Toronto	8	8	1	1	7	4	.....
Thunder Bay	.....	3	1	.....	4	1	2
Victoria	2	1	.....	.....	.....	.....	.....
Waterloo	2	1	.....	.....	5	6	2
Welland	7	5	.....	3	15	3	1
Wellington	3	2	3	1	1	8	2
Wentworth	2	.....	2	1	4	.....	2
York	1	1	.....	1	2	.....	1
Totals	113	170	27	41	196	213	76

different Sheriffs for the year ending 31st December, 1891.—*Continued.*

Amount Endorsed on Writs of Execution against Goods (not Renewals).				Amount Realized by Actual Sales under Writs of Execution.			
(1) For Debt or Damages.		(2) For Solicitor's Costs Taxed.		(1) Against goods.		(2) Against lands.	
H.C.J.	C. C.	H.C.J.	C. C.	H. C. J.	C. C.	H. C. J.	C. C.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
23370 03	17268 97	2110 37	1969 06	340 81	447 05	88 98	60 68
34016 77	6117 72	2477 63	613 97	716 82	.....	50 00	....
50841 19	8733 27	1174 30	966 14	228 93	519 44	213 43	.....
169112 97	16697 24	3292 31	1320 74	2879 77	319 35	889 00	.....
16073 44	4523 66	820 43	369 62	.....	.....	.....	.....
48178 78	6776 70	1548 89	627 05	1448 13	122 60	....	20 00
50897 11	1416 70	.....	.....	.....	582 44	....	410 00
21192 41	5904 48	893 43	455 50	1411 56	.....	....	384 90
52658 78	9299 63	2322 74	1055 65	181 29	858 42	.....	75 00
6361 64	1542 89	772 44	157 82	83 40	.....	.....	.....
16673 30	7129 45	968 43	878 55	.....	726 56	.....	30 00
139174 87	11634 58	4440 95	1029 53	933 11	338 80	1545 00	....
17022 13	7320 99	868 94	663 87	.....	209 25	120 00	105 00
48495 92	20218 69	3248 21	2009 27	2451 13	7624 41	525 00	436 25
70032 72	13471 68	2034 99	1436 39	1745 23	119 64	....	248 46
10497 82	3317 61	1820 78	317 15	43 00	.....	....	.....
93128 66	7998 44	1360 03	854 97	3614 85	1064 05	....	172 54
7034 35	4952 99	849 15	381 70	....	....	....	.....
132482 18	5913 67	721 13	1487 54	3257 73	135 00	1000 00	....
461725 33	14620 28	2653 66	949 28	550 00	258 97	65 80	.....
2772 34	1892 02	303 00	237 92	....	240 90	.....	.....
16693 91	4786 24	579 95	379 85	693 75	302 76	.....	215 71
86236 54	13044 67	3581 01	920 40	307 65	401 02	48 00	85 00
28456 81	8879 48	690 54	475 44	573 45	.....	6460 00	.....
40013 25	20290 01	2725 10	836 77	1148 10	791 16	1500 00	681 43
6962 46	2711 14	358 06	335 69	108 51	1180 25	....	....
71028 93	4128 55	1030 59	412 50	286 00	70 55	....	29 25
36992 32	9026 73	3831 59	575 84	5581 63	228 55	.....	.....
40528 10	7462 50	1416 27	816 72	2039 18	215 34	....	....
19104 62	6970 74	1920 46	1146 09	.....	....	.....	377 00
8008 56	3152 99	825 81	395 47	1023 50	292 96	250 00	126 50
2901 90	2673 44	74 53	209 74	....	213 00	.....	....
17515 49	9428 31	1004 52	672 65	636 77	525 19	.....	0 80
96420 91	15305 29	1976 42	972 43	676 10	139 21	6 00	10 00
16654 24	11698 53	1696 92	725 70	143 73	706 20	1969 00	225 00
616168 85	104661 80	24974 05	8978 25	3484 44	4553 32	240 00	2500 00
13352 63	9265 30	1974 33	1348 28	....	2305 25	1805 00	.....
34350 18	4343 36	701 84	300 41	308 50	182 71	.....	.....
11546 54	7419 30	294 01	285 79	735 40	98 23	....	.....
92488 67	6850 61	704 01	516 79	893 15	486 21	....	680 00
43229 61	11064 39	2788 75	2198 22	893 38	561 75	405 00	40 00
57684 71	10489 12	6230 75	1167 00	503 20	....	497 06	177 92
160856 08	36516 73	3093 41	1303 35	77 49	200 00	.....	5 00
2985951 11	486790 89	97154 76	42725 10	39999 69	26120 54	17677 27	7096 44

APPENDIX A.—Containing in Tabulated Form Statistics as returned by the

COUNTIES OR DISTRICTS.	AMOUNT RECEIVED FOR FINES, PENALTIES, ETC.		AMOUNT RECEIVED UNDER WRITS OF *Ca Re* AND *Ca Sa.*		AMOUNT REALIZED UNDER WRITS OF EXECUTION WITHOUT ACTUAL SALE.	
	H. C. J.	C. C.	H. C. J.	C. C.	H. C. J.	C. C.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Algoma						1290 19
Brant		75 00			245 02	1623 75
Bruce					575 75	786 63
Carleton					7018 74	3313 53
Dufferin						
Elgin					1163 88	1209 68
Essex		68 00	247 36	161 00	2952 61	2579 55
Frontenac		25 00				
Grey			14 00			2203 12
Haldimand					560 72	16 32
Halton					887 57	1089 09
Hastings	100 00				6101 68	1723 83
Huron					2412 50	606 95
Kent					1861 61	1218 22
Lambton						487 99
Lanark	200 00				574 20	282 52
Leeds and Grenville			545 00		942 04	1321 98
Lennox and Addington					61 70	285 84
Lincoln	1000 00				50 00	594 26
Middlesex					3644 86	1632 00
Muskoka					580 98	294 65
Norfolk					37 19	519 91
Northumberland and Durham			33 25			1241 53
Ontario					7725 00	1172 74
Oxford					680 64	2448 34
Parry Sound						
Peel					1202 23	1430 69
Perth					1385 15	1268 80
Peterborough					1197 75	1566 38
Prescott and Russell					667 25	1705 79
Prince Edward						766 78
Rainy River						250 00
Renfrew					851 59	1007 16
Simcoe		5 00			2050 28	3321 56
Stormont, Dundas and Glengarry		1 00		188 00	629 27	1679 52
Toronto					7518 85	4232 12
Thunder Bay					1552 93	447 29
Victoria					1570 14	385 36
Waterloo					3169 21	478 35
Welland					652 51	1231 95
Wellington						1279 92
Wentworth	50 00				790 86	56 53
York		50 00			2390 82	2980 83
Totals	1350 00	224 00	839 61	349 00	63705 53	52031 65

different Sheriffs for the year ending 31st December, 1891.—*Continued.*

Amount of Fees earned for the Administration of Justice payable by the Province.	Amount of Fees so earned payable by the County.	Amount of Fees otherwise earned.	Amount paid by the Province as salary.	Total amount of Fees earned	Remarks.
$ c.	$ c.	$ c.	$ c.	c.	
368 23	.....	174 46	1000 00	1542 69	
1429 12	442 22	840 15	.....	2711 49	
1205 95	539 61	1726 08	.....	3471 64	
1749 55	488 38	4293 38	.....	6531 31	
662 79	401 80	1135 22	.....	2199 81	
1244 45	375 60	1585 52	.....	3205 57	
1574 95	440 25	1990 91	.....	4006 11	
579 07	312 15	833 24	.....	1724 46	
584 05	1146 28	1568 33	.....	3298 66	
1322 14	400 42	382 24	100 00	2204 80	
707 37	371 90	562 43	.....	1641 70	
1150 40	642 49	3044 20	.....	4837 09	
958 80	461 23	2053 71	.....	3473 74	
883 30	663 90	2472 14	.....	4019 34	
1255 90	456 71	1288 68	.....	3001 29	
593 36	441 29	538 60	.....	1573 25	
828 35	789 92	1593 37	.....	3211 64	
602 13	376 13	927 78	.....	1996 04	
548 75	120 50	1427 70	.....	2096 95	
1568 38	1380 81	1334 12	.....	4283 31	
940 48	.....	367 82	500 00	1808 30	Nine months only.
726 23	530 86	1225 14	.....	2482 23	
1111 45	680 28	2087 29	.....	3879 02	
807 28	536 70	1538 83	.....	2882 81	
689 45	384 72	885 58	.....	1959 75	
704 76	.....	246 30	500 00	1451 06	
738 22	370 95	1111 77	.....	2220 94	
59 50	1187 40	1530 64	.....	2777 54	
711 34	493 93	1157 20	.....	2362 47	
640 00	446 49	1298 07	500 00	2884 56	
542 82	409 42	575 89	200 00	1728 13	
696 80	.....	251 02	1000 00	1947 82	
724 95	456 54	1281 57	.....	2463 06	
677 46	1068 68	2768 06	.....	4514 20	
829 19	950 23	1514 55	.....	3293 97	
501 55	4169 13	12992 15	.....	17662 83	
543 15	.....	1203 65	1200 00	2946 80	
595 60	675 50	1108 13	.....	2379 23	
902 29	441 73	1571 80	100 00	3015 82	
517 86	565 10	1029 85	.....	2112 81	
791 70	371 02	1250 68	.....	2413 40	
2809 40	482 65	1970 98	.....	5263 03	
2976 90	621 21	3754 16	.....	7352 27	
40055 42	25094 13	70493 39	5100 00	142742 94	

APPENDIX B.—Being a Return of Business transacted by Local Masters throughout the

COUNTIES OR DISTRICTS.	NUEBER OF ORDERS MADE FOR THE FOLLOWING PURPOSES.					Number of examinations taken as special examiners or otherwise before trial.
	(1) For the Administration of estates.	(2) For the partition or sale of property.	(3) Relative to infants under R. S.O., chap. 40, s. 76 (Examination only.	(4) Under the Winding up Acts.	(5) Other Orders made in Chambers.	
Algoma						
Brant	1					
Bruce	2				8	14
Carleton	1	3			88	33
Dufferin	1	3			14	1
Elgin	2	2				32
Essex		2		1	11	18
Frontenac		1				15
Grey	2	1				
Haldimand	1					
Halton						
Hastings	2	3			61	23
Huron	2	3			9	5
Kent	1	4	1		6	23
Lambton		2				
Lanark					4	
Leeds and Grenville	2	6			11	5
Lennox and Addington		1			9	3
Lincoln	3	2			2	16
Midd esex						32
Mu-koka and Parry Sound						
Norfolk						3
Northumberland and Durham	1		1		40	9
Ontario	2	1			11	1
Oxford	1	5				2
Peel						
Perth	1					6
Peterborough		1			29	2
Prince Edward					8	11
Prescott and Russell	1	1	1		2	2
Renfrew					8	5
Simcoe	2	1			52	14
Stormont, Dundas and Glengarry	4	2			68	7
Thunder Bay						
Victoria					36	
Waterloo		1			20	
Welland	1	4			23	
Wellington	3	3			64	63
Wentworth	2	1			33	3
Totals	38	53	3	1	617	348

Province of Ontario, other than Toronto during the year ending 31st December, 1891.

NUMBER OF JUDGMENTS OR ORDERS BROUGHT INTO THE MASTER'S OFFICE FOR TAKING THE FOLLOWING ACCOUNTS, ETC.:

Administration of estates.	Executors, trustees or committees accounts and compensation.	Foreclosure of mortgage or bond.	Redemption of mortgage or bond.	Sale under mortgage or agreement.	Account on any charge or lien on land, other than under Mechanics' Lien Act.	Account under Mechanics' Lien Act.	Specific performance.	Partnership accounts.	Alimony.	Partition or sale.	Damages for breach of contract or covenant.	Work and labor done.	Money received, paid, advanced or lent.	Goods sold and delivered.
.....	.....	1	.....	.....	.....	1	.....	.....	....	.....	.....	.....	...	.....
1	.....	1	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	.....	3	.....	2	2	1	....	.....	.....	1	.....	.....	.....	1
3	3	30	.....	.....	.....	3	.....	1	.....	3	....	2	.....	2
1	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	1	.....	2	1	.....	.....	.....	....	2	.....	.....	.....	.....
.....	3	2	.....	.....	.....	1	1	1	.....	2	.....	1	.....	.....
2	1	11	.....	8	1	3	1	.....	.....	2	.....	.....	.....	.....
1	.....	.....	.....	3	.....	.....	.....	.....	1	1	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	.....	7	.....	10	.....	.....	...	.....	.....	4	.....	.....	.....	.....
3	.....	1	.....	4	1	.....	.....	1	.....	1	.....	.....	.....	.....
1	1	.....	4	2	.....	1	.....	.....	.....	4	.....	.....	.....	.....
.....	.....	1	.....	.....	.....	5	.....	.....	.....	1	2	.....	.....	.....
.....	.....	5	....	10	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	1	2	.....	1	.....	.....	1	.....	.....	1	.....	.....	.....	.....
4	.....	4	....	9	.....	.....	.....	.....	.....	2	.....	.....	.....	.....
3	.....	.....	.....	.....	1	3	.....	2	.....	2	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	4	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
2	1	6	.....	4	.....	2	.....	.....	.....	1	.....	.....	.....	.....
1	.....	.....	.....	4	.....	2	.....	.....	.....	5	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	.....	2	.....	3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
....	.....	6	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
1	.....	3	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
1	.....	1	.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....
3	.....	4	.....	2	.....	.....	.....	.....	1	1	.....	.....	.....	.....
7	.....	10	.....	2	.....	1	.....	.....	.....	2	1	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	6	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
1	.....	7	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
3	....	1	.....	1	.....	.....	1	.....	1	5	.....	.....	.....	.....
4	1	3	.....	7	2	1	1	.....	.....	1	.....	...	.....	.....
71	18	121	7	85	8	28	6	6	5	43	4	4	2	3

APPENDIX B.—Being a Return of Business transacted by Local

COUNTIES OR DISTRICTS.	NUMBER OF JUDGMENTS OR ORDERS, ETC.—*Continued.*						Number of advertisements of sale issued.	Number of reports issued.
	Promissory notes, bills of exchange.	Bonds, life and fire insurance.	Infant's estates.	Quieting Title matter.	Lunacy.	Miscellaneous.		
Algoma								
Brant							4	7
Bruce							6	12
Carleton				1	2		11	50
Dufferin							5	14
Elgin						2	6	17
Essex					1	2	1	12
Frontenac					1	1	8	28
Grey							1	6
Haldimand				1				1
Halton								
Hastings				2		7	13	35
Huron		2		1			6	16
Kent			1	1			5	10
Lambton							2	3
Lanark						1	15	21
Leeds and Grenville				1			6	10
Lennox and Addington						1	5	10
Lincoln	1					1	5	16
Middlesex							5	9
Muskoka and Parry Sound								
Norfolk								
Northumberland and Durham				1	1		4	12
Ontario			1		3		6	15
Oxford							10	22
Peel								
Perth				1			4	11
Peterborough	1			1		4	6	12
Prince Edward							1	5
Prescott and Russell			1				4	5
Renfrew			1					2
Simcoe							3	11
Stormont, Dundas and Glengarry				1			8	33
Thunder Bay								
Victoria							6	6
Waterloo			1				1	13
Welland							8	11
Wellington				2			12	24
Wentworth		1	1				12	34
Totals	2	3	6	13	8	19	89	493

Masters throughout the Province of Ontario, etc.—*Continued.*

Number of references pending at date of return.	Number of bills of costs taxed by Master.	Amount realized by sales held under the direction of Master.	Amount of costs of references, etc., taxed by Master or under his direction.	Amount of commission allowed in administration and partition matters.	Amount of fees earned by Local Masters.	Remarks.
		$ c.	$ c.	$ c.	$ c.	
.....	.....	.....	18 36	.....	21 40	
4	8	.....	.....	.....	174 70	
7	12	6585 00	660 56	795 41	331 55	
13	33	13160 00	3355 08	775 69	2481 85	
8	26	9499 00	1891 53	459 23	336 96	
17	24	17630 00	1592 12	1257 58	1322 95	
8	4	25 00	356 05	94 00	405 76	
8	36	4293 00	4408 90	455 20	861 90	
6	6	2500 00	282 41	310 44	192 40	
.....	2	16 00	254 00	.....	59 00	
.....	.....	.....	.....	.....	.....	
6	39	260 85	3174 69	1640 40	1363 20	
10	9	22395 00	829 02	403 00	351 30	
3	.....	15044 00	1956 17	536 00	862 00	
.....	6	5268 00	.....	.....	166 26	
6	23	18011 75	2266 43	.....	388 59	
6	8	129 30	346 55	615 10	203 19	
3	7	9410 00	768 49	278 85	452 60	
8	16	15460 00	1649 65	607 19	815 41	
10	15	55622 75	1249 06	1951 58	715 14	
.....	.....	.....	.....	.....	107 70	
1	.....	.....	.....	.....	36 50	
2	15	16108 00	1010 93	648 50	629 31	
24	14	3698 70	2383 94	275 00	456 70	
6	19	16042 00	1198 05	816 87	415 56	
.....	.....	.....	.....	.....	.....	
7	13	14660 00	1385 84	399 23	489 00	
1	6	7400 00	978 59	.....	319 25	
2	4	.....	179 57	232 23	315 50	
1	4	1706 00	659 52	.....	75 20	
2	6	3825 00	110 08	.....	154 50	
10	21	11995 00	2254 90	456 92	581 80	
22	49	13685 00	3391 37	842 64	860 00	
.....	.....	.....	.....	.....	.....	
9	12	22600 00	1072 47	.....	292 90	
2	13	5000 00	1503 48	.....	261 88	
9	6	4030 00	910 69	148 00	207 00	
5	13	11505 60	476 05	14 9 94	1210 70	
37	33	16909 60	4140 63	527 31	791 62	
263	502	340443 95	46717 18	16136 31	18710 69	

APPENDIX C.—Being a Return of Business Transacted by Local Registrars, Deputy the year ending

COUNTIES OR DISTRICTS.	NUMBER OF WRITS ISSUED IN THE		NUMBER OF WRITS CA RE OR CA SA ISSUED.		TOTAL AMOUNT ENDORSED ON SUCH WRITS.		NUMBER OF ACTIONS ENTERED IN PROCEDURE BOOK.	
	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.
					$ c.	$ c.		
Algoma	19	10	.....	.....	.....	.....	11	3
Brant	70	34	.....	.....	76001 38	14267 22	52	30
Bruce	53	26	.....	.....	18476 90	23329 15	43	21
Carleton	206	104	.....	.....	346261 38	748455 78	175	107
Dufferin	46	23	.....	.....	25174 31	13846 47	40	18
Elgin	86	43	.....	.....	72856 67	21096 96	70	34
Essex	88	46	.....	.....	10221 91	17210 02	74	59
Frontenac	136	69	.....	.....	197231 53	87941 64	96	52
Grey	46	23	1	.....	33949 78	20629 00	36	21
Haldimand	12	7	.....	1	624 22	3460 37	12	7
Halton	18	10	.....	.....	12247 29	8283 58	.....	.....
Hastings	130	65	.....	.....	188784 74	63804 42	108	63
Huron	67	33	.....	.....	63323 90	29215 30	65	22
Kent	76	39	1	1	72425 30	22571 19	58	40
Lambton	85	43	.....	.....	352 9 14	20668 63	70	40
Lanark	73	37	.....	.....	50487 30	31557 0	46	28
Leeds and Grenville	43	22	.....	.....	85502 95	23844 00	35	8
Lennox and Addington	32	17	.....	.....	31243 94	7892 73	27	15
Lincoln	72	36	.....	.....	196193 21	96152 16	62	36
Middlesex	234	118	3	.....	252788 51	114107 00	157	95
Muskoka	4	2	.....	.....	1469 63	100 00	4	2
Norfolk	17	9	.....	.....	8741 40	467 00	11	2
Northumberland and Durham	82	41	.....	.....	100073 78	41454 70	31	20
Ontario	55	28	.....	.....	79435 21	35325 49	42	22
Oxford	67	34	.....	.....	41309 27	64144 19	56	33
Parry Sound	4	2	.....	.....	2173 00	.....	6	2
Peel	33	16	.....	.....	247464 31	16021 44	31	16
Perth	68	34	.....	.....	37991 21	19180 24	57	30
Peterborough	80	41	.....	.....	326986 90	34860 93	58	23
Prescott and Russell	21	10	.....	.....	6558 74	5004 27	19	10
Prince Edward	32	17	.....	.....	23237 69	15736 66	26	13
Renfrew	34	17	.....	.....	18781 43	7045 03	28	18
Simcoe	95	47	.....	.....	114205 27	63187 16	80	46
Stormont, Dundas and Glengarry	100	54	.....	.....	147883 97	52552 05	74	34
Thunder Bay	28	13	.....	.....	67098 12	22890 81	24	10
Victoria	31	16	.....	.....	15136 21	20395 42	31	13
Waterloo	71	36	.....	.....	26269 03	22296 68	50	26
Welland	31	16	.....	.....	29683 72	12326 14	24	19
Wellington	86	44	.....	.....	620 9 09	42839 01	56	31
Wentworth	263	132	12	.....	325050 74	241041 22	197	104
York	.....	932	.....	.....	3897118 63	2235135 23	.....	583
Total	2794	2346	17	2	7347681 71	4320236 30	2142	1756

Registrars and Deputy Clerks of the Crown throughout the Province of Ontario during 31st December, 1891.

Number of Lispendens Issued.		Nueber of Præcipe Orders Issued.		Number of Orders Issued and Signed by Local Judge		Number of Examination of Parties.		Number of Actions Entered for Trial.				Number of Judgments Entered without Trial.	
								(1) By Jury.		(2) Without Jury.			
Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy.
.....	.....	2	.....	11	1	.....	.....	1	2	6	1	10	.....
3	2	15	13	25	16	23	12	9	2	4	5	22	9
8	1	21	7	12	10	25	14	5	1	10	17	10	12
12	4	118	54	71	3	57	.....	35	.....	44	24	80	49
2	4	11	5	20	8	5	3	5	.....	2	.....	11	2
10	5	19	11	46	11	12	6	2	2	4	3	20	9
3	4	29	13	19	13	25	.....	16	5	11	16	25	9
4	4	40	24	44	28	29	6	17	6	5	7	48	23
2	2	22	14	7	6	23	12	5	5	10	11	11	6
2	.....	8	5	5	1	4	6	....	2	4	5	3	2
3	.....	6	4	7	1	.....	.....	5	1	.....	4	2	2
4	1	50	19	26	.....	25	.....	13	4	13	8	16	20
11	2	32	6	35	.....	31	5	15	4	6	4	17	8
10	.....	18	27	12	.....	7	11	3	.....	5	12	21	13
14	6	12	7	18	14	25	12	4	4	4	2	22	22
5	1	17	9	23	31	14	9	3	2	9	1	23	18
6	2	11	2	22	10	22	5	4	3	10	2	13	17
4	3	15	10	7	3	14	11	2	1	3	1	12	10
4	7	39	7	33	23	20	.....	8	.....	5	11	26	8
19	9	87	27	126	24	50	32	34	14	15	37	67	36
.....	.....	3	4	1	2	1	2	1	... .	.....	1	2	...
.....	.....	3	.....	2	1	2	.....	2	.....	2	.....	3	2
9	1	17	17	22	17	11	7	8	2	4	5	33	18
.....	3	7	12	10	5	11	5	6	2	5	2	13	10
11	3	24	16	20	10	40	18	17	4	3	6	16	14
.....	....	1	.....	...	.....	.....	.....	1	.....	.....	.....	2	1
.....	. . ....	13	6	17	9	11	.....	4	2	4	1	10	5
7	1	41	16	65	36	48	19	17	4	11	5	19	9
6	1	11	15	2	3	14	15	3	4	3	2	22	5
.....	1	3	3	16	7	6	1	2	1	3	1	14	6
1	.....	11	9	11	4	1	3	6	1	5	4	6	7
3	2	2	5	11	4	5	3	6	1	2	.....	17	12
6	7	54	20	13	52	.....	14	12	7	7	14	25	11
3	1	45	22	34	31	....	2	8	6	11	7	40	20
5	1	21	6	27	6	22	7	2	1	7	2	6	3
3	1	.....	.....	.....	... .	9	3	3	.....	.....	4	11	4
8	2	14	11	8	2	18	8	2	2	7	3	18	10
3	2	14	7	14	8	19	13	6	4	7	2	3	11
8	7	14	11	16	4	10	3	7	6	7	4	14	15
21	10	81	51	102	43	46	35	22	7	22	9	78	45
. .....	110	.....	395	.....	.....	.....	.....	145	62	112	41	...	. ...
220	210	951	890	960	447	685	302	466	174	392	284	811	483

APPENDIX C.—Being a Return of Business Transacted by Local Registrars, Deputy
the year ending 31st

COUNTIES OR DISTRICTS.	TOTAL AMOUNT OF SUCH JUDGMENTS WITHOUT COSTS.		TOTAL AMOUNT OF COSTS TAXED THEREUNDER.		TOTAL AMOUNT OF DISBURSEMENTS ALLOWED THEREUNDER.	
	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C.P. Divs.	Chy. Div.	Q. B. and C.P. Divs.	Chy. Div
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Algoma	7564 00		442 09		129 61	
Brant	47980 93	5770 09	838 92	234 02	229 93	68 78
Bruce	12020 95	13475 13	209 78	307 32	90 49	99 27
Carleton	81586 49	19530 05	2410 16	1940 75	767 18	353 05
Dufferin	4981 29	1353 28	148 85	45 00	53 87	16 50
Elgin	33029 21	4096 78	489 60	128 72	147 91	83 89
Essex	25120 68	5503 25	513 97	132 89	182 23	29 51
Frontenac	49565 17	13194 43	775 09	401 75	320 64	133 43
Grey	4582 79	3150 58	258 96	141 84	81 75	42 90
Haldimand	1022 70	2736 38	74 68	39 01	27 46	10 01
Halton	538 75	459 45	18 10	17 10	9 64	10 44
Hastings	130279 61	10724 98	1353 89	265 07	454 20	87 13
Huron	12580 01	2640 62	510 37	183 10	156 24	51 71
Kent	33358 87	15621 88	622 39	196 82	164 80	40 90
Lambton	21100 46	21898 77	669 82	501 80	144 09	133 80
Lanark	15190 07	16683 87	489 40	616 60	196 72	275 35
Leeds and Grenville	73506 62	10458 79	361 14	320 46	83 54	93 58
Lennox and Addington	7774 35	4920 41	387 11	341 07	136 47	130 09
Lincoln	75209 95	42795 25	616 82	306 78	223 88	87 35
Middlesex	96667 89	103437 00	2095 14	625 76	468 37	295 14
Muskoka	509 02		127 57		42 61	
Norfolk	4253 85		79 63		16 63	
Northumberland and Durham	49975 60	17968 87	939 00	610 54	497 32	167 03
Ontario	10535 35	13968 81	333 60	166 44	131 55	63 05
Oxford	12965 56	10885 00	373 06	1128 10	107 15	468 59
Parry Sound	1464 00		62 00	24 00		
Peel	33781 58	4737 59	380 46	135 23	123 09	36 23
Perth	9607 56	5366 82	338 14	224 89	84 49	72 40
Peterborough	30477 05	8791 05	772 86	133 07	244 55	37 00
Prescott and Russell	12378 00	6519 30	772 40	193 23	317 02	52 95
Prince Edward	6180 12	5741 69	211 47	212 30	64 43	74 80
Renfrew	7424 04	7049 32	565 09	406 42	176 43	126 93
Simcoe	25785 36	8559 22	1026 39	546 09	408 37	257 67
Stormont, Dundas and Glengarry	20129 10	17706 32	1114 95	726 48	259 38	147 63
Thunder Bay	4168 53	1576 63	408 40	91 66	90 60	28 61
Victoria	5795 58	2240 68	298 25	103 52	224 57	30 78
Waterloo	11436 98	5 00	499 04	207 35	148 86	53 60
Welland	604 33	2403 88	50 80	112 70	30 14	46 38
Wellington	9996 35	10293 39	415 06	276 88	127 37	76 41
Wentworth	119417 07	89508 99	3521 67	1714 79	1162 97	528 29
York						
Total	1110545 82	511773 58	25575 52	13759 55	8325 95	4311 18

Registrars and Deputy Clerks of the Crown throughout the Province of Ontario during December, 1891.—*Continued.*

Number of Judgments entered after trial.		Total Amount of such Judgments without Costs.		Amount of Costs Taxed thereunder.		Total Amount of Disbursements allowed.		Number of Judgments over—					
Q. B. and C. P Divs	Chy. Div.	Q. B. and C.P. Divs.	Chy. Div.	Q. B. and C.P. Divs.	Chy. Div.	Q. B. and C.P. Divs.	Chy. Div.	Over $10,000.	$10,000 and above $5,000.	$5,000 and above $2,000.	$2,000 and above $1,000.	$1,000 and above $500.	$500 and under.
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.						
.....	1	.....	1300 00	.....	127 52	.....	89 57	...	....	...	3	2	3
7	3	864 00	747 80	1136 54	373 01	554 85	166 84	....	3	7	6	10	15
3	6	931 94	1738 00	166 59	320 84	92 34	157 33	....	1	1	5	2	7
38	19	68279 74	58108 38	7787 33	2460 18	4147 20	1521 20	4	5	5	19	41	56
2	... ..	.....	.....	.....	... .	.....	.....	...	....	....	1	8	6
12	.....	6953 57	....	809 17	....	395 24	.....	1	....	3	6	9	7
6	9	661 25	3745 00	132 72	439 50	574 64	237 70	....	1	4	4	10	23
11	9	13910 96	2148 51	1419 50	556 93	755 26	300 32	1	3	5	11	20	51
7	9	6724 95	2458 27	251 87	1260 87	107 79	477 47	....	....	1	5	6	21
5	1	580 00	2812 50	636 07	....	248 72	.....	....	....	2	....	3	..
1	.....	.....	.....	.....	.....	.....	.....	....	....	....	....	1	1
16	7	4569 87	410 56	1984 10	342 77	809 16	143 33	1	6	3	4	16	32
16	.....	3110 94	.....	1482 12	.....	735 47	.....	....	....	1	3	13	20
2	5	551 50	1752 31	341 30	.....	212 24	.....	1	....	2	6	13	9
3	3	.....	.....	.....	.....	.....	.....	....	2	2	6	18	10
8	.....	1733 75	.....	1430 83	.....	884 63	.....	...	2	4	4	10	8
7	2	2607 36	4500 00	799 65	.....	371 58	.....	1	....	5	4	8	10
3	3	425 00	2132 32	102 15	975 22	7 74	432 93	....	....	1	5	5	17
7	5	4612 46	5681 34	1189 54	1494 34	424 79	689 55	2	2	4	7	5	16
12	16	1527 87	7021 32	2247 71	886 14	461 54	388 86	3	3	8	14	31	48
.....	.....	.....	.....	... .	....	.....	.....	....	....	....	....	.....	2
.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	...	3	2
9	4	1306 50	....	825 37	2319 67	488 34	954 62	1	....	4	7	13	20
6	4	.....	685 00	... ...	99 98	....	74 15	....	....	3	2	7	21
10	4	2156 73	2725 99	1863 35	693 71	929 89	535 77	....	1	4	3	12	16
2	.....	781 00	.....	312 00	....	....	.. ....	....	...	....	1	1	3
6	3	390 88	.....	228 76	... .	142 46	... ..	1	1	1	1	4	9
15	9	4683 51	1824 45	1821 73	459 25	642 63	165 96	....	....	3	4	6	39
3	4	7278 40	576 80	506 62	1014 82	314 02	675 37	. ..	3	5	3	7	15
1	1	505 50	....	114 19	.....	65 97	.....	....	1	1	3	6	8
4	1	3065 32	1245 50	831 92	457 34	419 21	269 50	....	....	3	1	4	10
1	1	325 00	2375 18	59 56	80 88	13 16	46 90	....	....	1	6	7	9
12	7	2445 90	3015 16	3224 57	951 65	2362 17	621 31	....	1	6	4	11	9
11	4	1351 00	17984 58	1115 84	856 13	256 82	442 18	1	2	2	5	11	54
3	2	....	.....	205 52	524 37	109 41	455 15	....	....	....	1	5	2
2	.....	644 61	.....	147 85	... .	112 46	.....	....	....	1	....	7	5
1	3	850 00	400 00	389 20	250 00	.....	.....	....	....	....	1	3	24
6	2	1662 78	134 55	506 70	....	532 29	.....	....	....	....	2	1	19
8	3	3422 72	450 25	1315 15	399 27	638 33	249 62	....	....	3	7	10	9
26	8	6925 38	2158 61	4298 03	1704 58	2111 12	704 38	3	6	16	29	40	49
.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	....	.....	....
292	158	155920 39	128132 38	39683 05	18898 97	19921 47	9800.01	20	43	111	193	389	685

APPENDIX C.—Being a Return of Business Transacted by Local Registrars, Deputy the year ending 31st

COUNTIES OR DISTRICTS.	NUMBER OF WRITS OF EXECUTION ISSUED AGAINST GOODS.		NUMBER OF WRITS OF EXECUTION AGAINST LANDS.		AMOUNT OF MONEY PAID INTO COURT WITH DEFENCE.		AMOUNT OF SAME PAID OUT OF COURT.	
	Q. B. and C. P. Divs.	Chy. Divs.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.
					$ c.	$ c.	$ c.	$ c.
Algoma	3	1	3	1				
Brant	18	12	17	12				
Bruce	8	6	7	6				
Carleton	76	44	63	37				
Dufferin	5	1	3	1				
Elgin	23	8	18	6				
Essex	11	3	5	2		25 00		25 00
Frontenac	46	22	41	19				
Grey	15	11	13	9				
Haldimand	1	4	1	1			201 45	
Halton								
Hastings	29	15	25	11				
Huron	16	3	11	3	275 00			
Kent	12	7	11	8				
Lambton	17	12	16	9	774 00	301 66	574 00	138 66
Lanark	18	4	11	3		113 61		
Leeds and Grenville	12	6	5	4				
Lennox and Addington	7	9	7	5	141 61		141 61	
Lincoln	19	9	17	7	100 00			
Middlesex	59	30	44	24	160 55			
Muskoka	1		1					
Norfolk	1	1	1					
Northumberland and Durham	16	14	12	9				
Ontario	10	6	5	1				
Oxford	21	7	14	6				
Parry Sound	1	1	2					
Peel	6	4	1	2				
Perth	18	8	14	6				
Peterborough	17	3	13	2	200 00			
Prescott and Russell	11	1	7	1				
Prince Edward	4	4	2	3	190 36			
Renfrew	6	7	5	4	154 65			
Simcoe	20	19	51	18	22 00			
Stormont, Dundas and Glengarry	19	10	16	8	452 32	452 32		
Thunder Bay	8	3	8	2				
Victoria	9	4	4	1				
Waterloo	13	3	10	3				
Welland	7	3	6	2				
Wellington		7		6				
Wentworth	67	35	52	25	1238 68	2 00		2 00
York		272		210				
Total	650	619	542	477	3709 17	894 59	917 06	165 66

Registrars and Deputy Clerks of the Crown throughout the Province of Ontario during December, 1891.—*Continued.*

Balance of Money remaining in Court.		Number of days of sitting of Judge at Trials.		Amount of Fees collected in Law Stamps by Deputy Clerks.	Amount of Fees collected in law stamps by Deputy Registrars.	Amount of salary paid Deputy Clerk of the Crown.	Amount of salary paid Local Registrar as Deputy Registrar in Chancery.	Amount of Fees earned by Deputy-Clerks or Local Registrars and paid in cash.	Amount of Fees earned by Deputy-Registrars.	Total amount of Salaries paid and Fees earned by Deputy-Clerks and Deputy-Registrars.
Q. B. and C. P. Divs.	Chy. Div.	Q. B. and C. P. Divs.	Chy. Div.							
$ c.				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	.....	4	.....	86 00	.....	.....	150 00	24 00	.....	174 00
.....	.....	8	3	475 70	.....	450 00	225 00	425 45	.....	1100 45
.....	.....	7	2	314 80	140 70	450 00	.....	300 00	140 70	890 70
.....	.....	39	5	2174 65	669 89	450 00	.....	687 40	774 41	1912 01
.....	.....	6	.....	256 10	.....	450 00	225 00	103 10	.....	778 10
.....	.....	20	9	648 00	.....	450 00	225 00	264 50	.....	939 50
.....	.....	14	3	212 70	37 20	450 00	.....	901 55	242 00	1593 55
.....	.....	10	2	1028 80	.....	450 00	225 00	267 75	.....	942 75
.....	.....	9	5	394 00	.....	500 00	250 00	180 30	.....	930 30
.....	.....	5	.....	150 30	.....	400 00	200 00	127 55	.....	727 55
.....	.....	.....	.....	117 25	.....	400 00	200 00	96 55	.....	696 55
.....	.....	12	3	656 60	344 30	450 00	.....	609 33	344 30	1403 30
.....	.....	16	2	465 30	84 30	500 00	.....	885 30	84 30	1469 60
.....	.....	20	5	228 70	1375 00	450 00	.....	40 00	1375 00	1865 00
200 00	163 00	20	2	555 50	.....	450 00	225 00	274 00	.....	949 00
.....	113 61	6	.....	530 41	.....	450 00	225 00	192 40	.....	867 40
.....	.....	13	5	252 20	.....	500 00	.....	256 89	.....	756 89
.....	.....	4	.....	347 90	.....	400 00	200 00	327 20	.....	927 20
.....	.....	6	3	476 20	63 00	450 00	.....	308 04	247 90	1005 94
.....	.....	36	10	1336 20	.....	500 00	.....	572 55	626 40	1698 95
.....	.....	2	.....	43 70	.....	150 00	.....	60 80	.....	210 80
.....	.....	4	2	76 60	.....	450 00	225 00	36 00	.....	711 00
.....	.....	9	2	662 15	.....	500 00	250 00	188 00	.....	938 00
.....	.....	8	4	349 30	.....	450 00	225 00	175 50	.....	850 50
9 50	.....	11	4	461 40	61 60	450 00	.....	509 20	342 16	1301 36
.....	.....	1	.....	35 30	.....	600 00	.....	5 00	.....	605 00
.....	.....	4	.....	230 26	.....	400 00	200 00	123 47	.....	723 47
.....	.....	9	8	708 30	.....	450 00	225 00	831 91	.....	1506 90
.....	.....	2	2	461 20	.....	450 00	225 00	245 40	.....	920 40
.....	.....	4	.....	194 90	.....	450 00	225 00	131 05	.....	806 05
.....	.....	6	.....	299 60	.....	400 00	200 00	180 40	.....	780 40
.....	.....	6	.....	263 20	.....	400 00	200 00	61 00	.....	661 00
.....	.....	14	7	503 60	40 20	500 00	.....	390 26	428 10	1318 36
.....	.....	8	4	743 90	.....	500 00	250 00	179 30	.....	929 30
.....	.....	6	.....	291 40	.....	400 00	200 00	430 10	.....	1030 10
.....	.....	8	1	.....	.....	450 00	225 00	129 05	.....	804 05
.....	.....	6	.....	.....	.....	850 00	225 00	385 00	.....	1460 00
.....	.....	5	.....	399 80	.....	633 00	200 00	311 50	.....	1144 50
.....	.....	16	4	369 00	30 30	500 00	.....	96 75	254 04	850 79
1238 68	.....	19	5	1613 80	628 70	500 00	.....	457 45	628 70	1586 15
.....	.....	139	.....	.....	.....	.....	.....	.....	.....	.....
1448 18	276 61	542	102	17714 72	3475 19	18083 00	5425 00	11771 00	5488 01	40756 87

APPENDIX D.—Being a Return of Business Transacted by County Court Clerks

COUNTIES OR DISTRICTS.	Number of Writs of Summons issued.	Number of Writs of *Ca. Re.* issued.	Total amounts indorsed on Writs of Summons and *Ca. Re.*	Number of actions entered in Procedure Book.	Number of lis pendens issued.	Number of præcipe orders issued.	Number of orders issued and signed by Local Judge.	Number of Examinations of Parties.	Number of Actions entered for Trial.		Number of Judgments entered without trial.
									(*a*) By Jury.	(*b*) Without Jury.	
			$ c.								
Algoma	50	....	.....	34	....	11	50	13	4	4	20
Brant	41	....	6885 23	47	8	10	19	17	6	.....	17
Bruce	43	....	8301 65	29	1	4	40	8	4	8	17
Carleton	155	....	31140 71	124	1	38	44	22	7	19	83
Dufferin	18	....	2910 57	14	...	3	8	6	1	.....	4
Elgin	43	....	7686 00	38	....	7	14	9	4	1	20
Essex	59	....	11608 24	44	....	8	8	19	4	4	26
Frontenac	76	....	15130 10	63	2	17	35	16	2	6	33
Grey	34	1	7271 26	25	....	10	6	5	3	...	9
Haldimand	19	....	2316 72	19	...	5	9	2	1	1	6
Halton	18	....	3491 72	....	2	2	13	...	.....	...	10
Hastings	103	.	20293 35	71	....	27	12	19	18	4	32
Huron	46	1	7244 20	44	....	12	22	6	7	7	20
Kent	68	....	12609 00	....	4	15	11	4	....	.....	32
Lambton	66	...	11382 75	49	1	3	14	10	3	2	32
Lanark	34	....	4026 02	30	2	4	29	6	2	1	11
Leeds and Grenville	51	1	10359 93	46	1	2	23	5	5	6	24
Lennox and Addington	21	..	4114 04	14	..	6	20	5	1	1	5
Lincoln	41	....	7685 14	34	....	7	18	6	4	1	20
Manitoulin	13	....	3506 91	7	....	....	4	2	2	5	3
Middlesex	275	2	56122 56	185	2	34	112	36	10	5	136
Muskoka	16	....	3010 55	15	....	6	11	2	2	.....	9
Norfolk	18	....	3812 62	17	....	7	11	6	3	3	5
Northumberland and Durham	48	....	10551 37	10	1	15	33	15	9	2	17
Ontario	36	....	8239 71	28	...	3	18	5	4	.....	17
Oxford	66	...	13648 00	55	....	15	39	17	10	2	23
Parry Sound	3	....	666 00	3	....	1	1	1	2	.....	.....
Peel	25	....	5074 46	24	....	5	15	3	4	3	15
Perth	39	....	8477 97	45	....	15	19	12	6	4	26
Peterboro'	42	....	8964 03	32	1	12	20	10	5	2	18
Prescott and Russell	33	....	4950 43	27	....	4	25	3	3	1	21
Prince Edward	13	....	2557 64	9	....	6	9	7	3	2	4
Rainy River	9	....	9704 34	7	....	2	11	5	....	1	4
Renfrew	49	....	9747 36	36	....	3	24	1	2	1	23
Simcoe	83	....	16705 40	.....	....	29	28	..	7	7	45
Stormont, Dundas and Glengarry	113	....	21575 48	74	1	22	11	3	6	2	45
Thunder Bay	41	....	13356 79	37	..	21	49	13	8	8	25
Victoria	26	....	5518 20	26	....	....	....	6	3	1	7
Waterloo	68	....	11176 39	49	....	4	14	5	.....	1	32
Welland	26	....	5918 31	21	..	7	18	6	2	3	16
Wellington	76	....	14325 42	6	1	16	58	19	9	1	37
Wentworth	209	1	44741 00	153	2	29	90	22	17	4	87
York	1119	5	238518 26	839	30	130	458	125	45	70	565
Totals	3432	11	688325 83	2487	60	577	1473	502	238	193	1601

throughout the Province of Ontario, during the year ending 31st December, 1891.

(a) Total amount of such Judgments without costs.	(b) Total amount of costs taxed thereunder.	(c) Total amount of Disbursements allowed.	Number of Judgments entered after Trial.	(a) Total amount of such Judgments without costs.	(b) Total amount of Costs taxed thereunder.	(c) Total amount of Disbursements allowed.	No. of Transcripts of Judgments received from Division Courts.	Number of Judgments. Over $200.	$200 and over $100.	$100 and under.	Number of days of sitting of Judge at trials.	Amount of money paid into Court with defence.
$ c.	$ c.	$ c.		$ c.	$ c.	$ c.						$ c.
9228 94	968 72	323 47	4	154 50	373 84	182 54	5	13	6	5	13	25 00
2505 31	421 13	139 23	3	7500 00	446 95	288 55	11	12	7	1	9	.....
3144 43	337 51	101 68	2	390 32	107 67	63 75	22	9	8	3	11	.....
17718 34	1514 68	458 84	11	1268 80	1045 10	593 29	23	47	30	5	23	708 99
1157 53	52 65	19 58	.....	.....	.....	.....	18	4	.....	.....	2	100 00
3949 20	324 51	140 45	1	55 00	192 01	92 77	17	11	4	4	8	.....
4996 50	591 55	251 05	3	.....	262 98	158 25	49	10	14	5	10	.....
7072 71	304 91	136 58	4	391 68	235 15	265 03	15	30	7	.....	10	.....
1951 64	172 59	51 21	4	636 19	550 33	219 39	28	7	3	3	4	.....
957 30	97 75	26 21	1	200 00	3 50	.....	4	3	4	.....	2	.....
2568 06	158 03	66 79	1	150 00	57 05	58 69	6	9	2	1	.....	.....
6155 18	633 19	188 56	4	697 50	410 50	202 21	14	23	5	8	14	259 26
4860 67	501 89	179 68	4	227 15	518 61	272 75	16	14	4	6	9	.....
7412 05	705 31	255 37	.....	.....	129 86	93 82	27	22	9	5	6	.....
6810 68	640 15	166 89	1	197 89	52 98	29 19	27	21	10	2	4	305 00
2340 42	277 08	87 37	1	295 00	55 51	29 85	8	7	3	.....	2	189 97
4873 97	429 84	126 29	3	5 00	323 71	191 16	18	15	11	1	9	.....
1283 30	74 66	23 88	2	180 00	303 26	126 06	11	5	1	1	3	50 00
4123 67	295 95	104 90	1	183 00	144 73	91 09	10	12	7	1	5	200 00
860 49	30 59	5 61	5	1026 34	614 43	71 00	1	4	3	1	.....	.....
29133 65	2170 84	716 13	3	183 31	540 71	235 50	48	72	55	12	16	248 00
1562 27	188 64	86 29	2	278 69	301 66	180 13	2	2	8	1	4	.....
1327 57	78 10	22 90	1	.....	84 69	24 86	12	5	.....	1	5	.....
3295 16	370 15	103 98	5	727 22	181 37	83 65	32	12	5	5	7	20 00
4641 41	242 47	112 17	3	118 66	106 71	106 68	19	14	4	2	.....	.....
5273 48	384 09	122 21	4	604 21	409 91	229 33	14	20	6	1	14	50 00
.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	.....
3105 50	266 87	81 64	1	200 00	75 55	42 75	4	6	2	1	10	.....
4490 66	276 68	93 94	3	364 89	333 47	68 30	11	11	5	13	6	73 68
4280 06	346 59	113 85	3	.....	155 55	167 37	18	14	17	15	6	285 85
3079 09	526 42	158 69	.....	.....	.....	.....	12	6	7	8	5	102 46
865 45	79 19	21 94	2	101 41	236 14	139 94	4	3	2	1	8	169 99
1209 20	104 73	24 28	.....	.....	.....	.....	.....	3	1	.....	1	145 00
5189 49	445 97	131 12	2	329 61	131 04	70 87	19	15	6	2	3	.....
9157 24	1249 62	391 25	9	1164 78	1368 51	941 90	66	30	14	5	9	502 26
8848 03	1837 95	244 82	8	938 93	1066 67	564 64	26	23	25	5	10	195 18
6985 37	876 99	241 53	8	1616 98	467 64	218 44	8	19	12	1	6	428 83
1648 74	142 58	52 68	1	.....	124 00	32 80	13	.....	.....	.....	3	.....
6370 96	684 28	245 94	2	212 00	363 61	.....	25	14	12	6	2	127 10
3771 52	243 24	108 96	1	.....	18 80	18 19	14	12	4	1	7	.....
7674 02	724 61	197 92	8	457 32	591 67	343 28	30	24	15	6	10	.....
18965 39	1737 38	556 21	7	693 15	708 12	406 23	39	59	24	11	17	71 00
130160 65	9176 24	2530 01	73	8801 40	5309 29	2018 68	236	403	170	65	96	1575 24
355602 30	30677 32	9212 10	201	30350 93	18403 28	8923 23	984	1045	532	214	391	5832 80

APPENDIX D.—Being a Return of Business Transacted by County Court Clerks through

COUNTIES OR DISTRICTS.	Amount paid out.	Balance in Court.	Number of Writs of Execution issued against goods.	Number of Writs of Execution issued against Lands.	Number of Writs of *Ca. Sa.* issued.	Number of Certificates issued under Creditors' Relief Act.	Amount for which issued, without Costs.	Amount of Costs allowed thereunder.
	$ c.	$ c.					$ c.	$ c.
Algoma	25 00		16	21				
Brant			42	51				
Bruce			12	12				
Carleton	491 50	217 49				1	737 00	10 00
Dufferin	100 00		19	22				
Elgin			36	36				
Essex			68	62				
Frontenac	10 00		72	74		6	3216 46	72 10
Grey			38	37	1	2	137 00	8 41
Haliburton								
Halton						3	1985 67	78 73
Hastings	104 26	155 00	48	37		11	5092 41	68 50
Huron			36	33				
Kent			20	50		13	2832 38	134 46
Lambton	305 00		28	24		3	1002 41	40 55
Lanark	189 97		24	17				
Leeds and Grenville			21	18	1	13	11328 35	61 98
Lennox and Addington		50 00	19	18	2	5	393 12	30 45
Lincoln			24	22		1	1172 70	10 10
Manitoulin			4	4				
Middlesex	276 80		174	156		3	237 77	18 48
Muskoka			2	2				
Norfolk			15	16				
Northumberland and Durham		101 00	47	40				
Ontario			42	54	2			
Oxford	47 13	405 46	44	38		4	9303 31	46 50
Parry Sound				2				
Peel			15	12				
Perth			25	23		1	110 60	28 69
Peterboro'	135 85	150 00	39	30		1	196 59	8 09
Prescott and Russell	102 46		12	11		1	92 55	11 15
Prince Edward			6	4		4	379 03	24 04
Rainy River	145 00		3	2				
Renfrew			29	28	1			
Simcoe	504 15		72	127		3	299 08	16 80
Stormont, Dundas and Glengarry	195 15		76	78		2	137 92	8 00
Thunder Bay	78 83	350 00	35	39				
Victoria			38	47				
Waterloo	127 10		50	59				
Welland			23	20		1	2926 99	12 65
Wellington			21	25		3	1228 00	29 65
Wentworth		71 00	123	90		1	955 28	27 75
York	1060 61	53464 08	571	483	1	1	337 25	14 75
Totals	3898 81	54964 03	1989	1924	8	83	48101 87	761 63

out the Province of Ontario, during the year ending 31st December, 1891.—*Continued.*

Number of Partition Matters.	Amount of money paid thereunder.	Amount paid out.	Amount at the joint credit of Judge and Clerk, including interest allowed.	Number of Chattel Mortgages and Bills of Sale filed.	Total amount secured by such Mortgages.	Number of Mortgages renewed.	Number of Discharges filed.	Number of assignments filed under 48 Vic., chap. 26 (Ont.)	No. of Hire Receipts filed under 51 Vic. cap. 19.	Total amount secured by such receipts, etc.	Amount of fees earned by the Clerk of Court not including salary paid.
	$ c.	$ c.	$ c.							$ c.	$ c.
....	.....	....	.....	134	142311 25	22	4	11	7	835 00	393 16
....	.....	.....	1455 83	392	172915 46	167	7	23	31	2548 35	775 90
....	951 93	2822 35	7262 75	867	211440 00	237	15	20	43	3751 30	986 50
....	.....	.....	.....	412	203427 15	272	45	38	54	9938 75	1333 61
....	.....	.....	.....	181	530 5 50	81	3	9	82	5148 55	349 50
....	.....	....	.....	459	180274 98	77	15	23	51	5273 12	575 25
....	.....	. ...	.....	123	186125 26	107	5	31	56	5883 70	808 85
....	.....	.....	286 42	433	156852 68	117	4	11	12	16 8 54	659 35
....	.....	.....	.. ....	1225	329325 89	314	8	17	99	3455 65	846 70
1	2941 18	2259 26	681 92	168	33121 5	56	3	4	22	1838 84	264 05
....	....	..... .	.....	139	63965 61	44	3	17	6	3520 6.	327 85
....	.....	.. ..	1302 29	915	259337 31	266	24	23	103	13611 35	1216 12
....	3000 00	3142 36	8197 14	364	122339 75	154	5	23	41	9278 00	738 95
...	.....	.....	.....	1078	143301 97	235	11	26	134	8100 35	690 50
....	.....	.....	.....	399	149586 20	122	16	25	78	12633 03	629 30
....	.....	.....	.....	146	103866 77	61	4	9	8	573 75	309 20
....	.....	.....	....	367	104626 11	112	16	25	22	2658 50	752 05
....	....	.....	.....	170	85626 97	86	6	5	35	2695 00	372 20
1	....	.....	....	239	94897 63	87	13	6	13	21145 05	505 95
....	....	.....	....	92	434964 39	22	2	... ..	19	963 00	120 60
....	.....	.....	789 83	570	219709 22	236	15	34	60	8748 30	1564 10
....	.....	.....	.....	.....	.....	.....	.....	.....	37	2571 99	78 80
1	224 46	638 66	2176 30	233	51571 80	72	10	4	84	4649 50	472 11
....	.....	.....	.....	502	178739 07	297	9	12	30	14274 35	866 35
....	.....	.....	.....	441	120512 64	154	5	14	60	9879 93	665 05
....	.....	.....	2288 30	293	120376 15	77	14	22	16	2311 46	843 34
....	.....	....	....	132	20 2975 00	13	8	8	37	2651 00	17 35
....	.....	... .	54 21	133	46445 97	57	2	12	4	455 00	306 59
....	.....	.....	....	328	192863 67	93	7	19	14	1718 30	634 10
....	.....	.....	.....	333	165269 33	114	3	14	17	5206 00	486 65
....	.....	.....	....	222	95750 29	43	6	10	12	120 50	368 75
..	.....	.....	....	177	51414 55	96	2	6	18	13034 83	372 60
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89 00
....	... .	.....	....	326	65345 94	98	4	14	3	2980 00	410 92
....	.....	.....	.....	621	339757 30	258	11	30	154	17019 37	1274 02
....	.....	.....	.....	397	154547 30	101	16	24	25	250 00	755 88
....	.....	.....	....	39	20010 35	11	3	7	41	7430 00	454 65
....	.....	.....	... .	392	176270 66	108	5	9	45	3289 70	566 05
7	2203 97	820 08	1383 89	220	128003 42	69	14	17	46	6 99 10	369 00
4	925 74	.. ..	925 74	383	217479 93	90	21	7	23	989 83	441 05
6	5387 00	589 16	4797 84	542	244130 98	135	5	19	46	2743 00	860 35
1	.....	.....	.....	395	168608 40	202	17	34	31	4377 91	1388 41
....	.....	.....	1250 67	1640	1006632 10	447	98	176	118	37715 00	5799 65
21	15631 28	10271 87	32853 13	16703	7288366 36	5410	484	1838	1837	264355 50	31743 66

APPENDIX E.—Being a Return of business transacted by Surrogate Registrars

COUNTIES OR DISTRICTS	Number of Probates issued.	Number of Letters of Administration issued.	Number of Letters of Guardianship issued.	Number of Probates and Letters issued under R.S.O. 1887, c. 50, Sec. 67, as amended by 53 Vict., Chap. 17, Sec. 17, and included in the previous numbers.	Number of Wills proved Guardianship issued where			
					Above $100,000.	From $50,000 to $100,000.	From $25,000 to $50,000.	From $10,000 to $25,000.
Algoma	.....	.....	.....	4	.....	.....	.....	.....
Brant	61	30	6	16	.....	.....	1	3
Bruce	75	30	3	13	.....	.....	.....	4
Carleton	100	35	6	10	.....	2	2	5
Dufferin	30	13	5	5	.....	1	.....	.....
Elgin	74	47	6	9	1	.....	.....	1
Essex	53	19	.....	.....	.....	.....	1	.....
Frontenac	63	45	2	8	.....	2	1	5
Grey	82	33	2	20	.....	.....	.....	1
Haldimand	47	13	3	6	.....	1	.....	1
Halton	27	22	2	6	.....	.....	2	2
Hastings	62	39	3	12	.....	.....	.....	1
Huron	114	46	3	6	1		1	4
Kent	72	17	.....	4	.....	.....	2	4
Lambton	82	41	5	14	.....	1	3	3
Lanark	41	25	.....	20	.....	.....	1	2
Leeds and Grenville	110	37	3	15	.....	1	.....	4
Lennox and Addington	36	11	.....	3	.....	.....	.....	.....
Lincoln	45	13	2	7	1	.....	.....	2
Manitoulin	2	2	1	3	.....	.....	.....	.....
Middlesex	163	76	6	26	1	2	2	7
Muskoka	2	4	1	3	.....	.....	.....	1
Norfolk	47	25	.....	10	.....	.....	.....	1
Northumberland and Durham	120	51	6	20	1	2	4	8
Ontario	66	38	5	12	.. ..	.....	.....	4
Oxford	74	45	2	5	....	.....	3	11

throughout the Province of Ontario during the year ending December, 1891.

and Letters of Administration or personalty valued as follows:				Total amount of personalty devolving.	Total amount of realty to be administered under R.S.O. 1887, c. 108, s. 4.	Amount of Fees collected by Surrogate Registrar for—			
From $5,000 to $10,000.	From $1,000 to $5,000.	From $400 to $1,000.	$400 and under.			Registrar's Fees.	Judge's Fees.	Fee Fund.	Total.
				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	.....	.....	.....	685 00	350 00	81 90	34 00	23 50	139 40
3	28	18	44	196880 95	376599 40	791 90	363 50	243 50	1398 90
2	43	27	29	187678 00	46430 00	902 38	389 50	260 00	1551 88
7	48	36	41	505875 93	17470 00	1328 90	741 50	506 50	2576 90
3	22	10	12	174196 23	6820 00	425 80	250 50	156 50	832 80
5	53	43	24	313245 94	323910 00	1012 27	693 00	344 40	2049 67
3	22	19	27	124465 92	153898 00	620 05	275 00	186 00	1081 05
3	29	25	41	372855 18	351887 84	1094 31	831 20	385 50	2310 81
8	32	37	39	175920 14	133055 00	836 85	365 00	254 00	1455 85
1	13	20	24	124735 37	149915 00	657 20	284 30	166 00	1107 50
2	16	17	12	161182 80	124125 00	512 75	73 00	159 50	745 25
4	27	25	44	116201 50	41160 00	776 00	319 10	228 00	1323 10
12	48	49	47	503720 60	54300 00	1673 90	1021 50	515 00	3210 49
7	25	17	17	225512 55	207414 00	687 25	438 50	254 10	1379 85
6	44	31	34	375031 88	437140 00	837 35	558 50	381 00	1776 85
6	18	13	28	170775 07	132150 00	528 00	285 00	188 00	1001 00
6	56	27	53	337092 69	34155 00	1277 47	602 00	420 50	2299 97
4	13	18	12	79518 59	16800 00	426 00	597 00	121 00	1144 00
2	18	15	20	224641 71	202140 00	546 65	362 30	212 50	1121 45
.....	.....	2	3	1336 43	3100 00	30 30	.....	.....	30 30
11	91	51	80	872767 80	132215 00	1927 70	1417 50	832 00	4177 20
.....	2	1	3	17642 45	1500 00	64 88	32 00	18 50	115 38
5	20	16	20	101451 61	23813 00	718 25	382 10	167 00	1267 35
9	63	32	58	859025 56	509735 43	1441 50	1153 50	712 00	3307 00
10	35	29	26	231484 79	77199 00	923 40	500 80	281 00	1705 20
6	55	19		429918 83	72821 43	1291 77	750 50	429 00	2471 27

APPENDIX E.—Being a Return of business transacted by Surrogate Registrars

COUNTIES OR DISTRICTS.	Number of Probates issued.	Number of Letters of Administration issued.	Number of Letters of Guardianship issued.	Number of Probates and Letters issued under R.S.O. 1887, c. 50, Sec. 67, as amended by 53 Vict., Chap. 17, Sec. 17, and included in the previous numbers	Number of Wills proved Guardianship issued where			
					Above $100,000.	From $50,000 to $100,000.	From $25,000 to $50,000.	From $10,000 to $25,000.
Parry Sound	2	4	.....	2	.....	.....	.....	.....
Peel	47	26	2	6	.....	.....	.....	1
Perth	93	28	2	6	.....	1	.....	6
Peterboro'	52	22	2	14	.....	.....	1	3
Prescott and Russell	27	18	1	7	1	.....	1	1
Prince Edward	33	7	.....	4	.....	.....	.....	.....
Rainy River	1	1	.....	.....	.....	.....	.....	.....
Renfrew	26	29	.....	3	.....	.....	.....	1
Simcoe	90	38	3	11	.....	.....	.....	2
Stormont, Dundas and Glengarry	59	33	2	26	.....	1	2	5
Thunder Bay	2	2	.....	.....	.....	.....	.....	.....
Victoria	33	14	1	.....	.....	.....	.....	2
Waterloo	104	28	3	12	.....	.....	2	9
Welland	52	21	2	7	1	1	.....	4
Wellington	91	44	2	.....	.....	.....	.....	5
Wentworth	129	65	11	20	.....	1	6	10
York	483	224	10	80	4	8	12	24
Total	2972	1361	113	455	10	24	47	147

throughout the Province of Ontario, etc.—*Continued.*

and Letters of Administration or personally valued as follows :				Total amount of personalty devolving.	Total amount of realty to be administered under R.S.O. 1887, c. 108, s. 4.	Amount of Fees collected by Surrogate Registrar for—			
From $5,000 to $10,000.	From $1,000 to $5,000.	From $100 to $1,000.	$100 and under.			Registrar's Fees.	Judge's Fees.	Fee Fund.	Total.
				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	1	1	4	2345 00	.....	38 90	14 50	11 00	64 40
6	31	13	24	116546 01	47030 00	701 35	500 50	166 50	1368 35
7	51	19	39	328928 22	47348 00	1105 75	711 80	370 00	2187 55
3	36	9	21	170226 12	19270 00	630 95	321 00	205 00	1156 95
2	14	9	18	250092 88	73861 00	380 98	325 00	196 00	901 98
1	9	14	16	40733 83	1000 00	328 94	115 00	84 00	527 94
.....	2	.....	.....	.....	.....	19 20	7 00	6 00	32 20
3	15	17	25	79954 96	73865 00	432 30	188 50	55 91	676 71
8	55	31	30	1869 11	62374 00	1271 28	459 50	340 50	2071 28
3	31	26	26	383510 47	19915 55	782 69	462 50	317 10	1562 29
1	.....	.....	2	2362 00	.....	28 51	8 50	9 00	46 01
2	22	11	10	98991 39	161460 00	406 50	191 00	129 50	727 00
10	55	14	43	422272 32	373449 00	1082 95	631 50	429 50	2143
6	25	12	26	385717 70	245303 70	375 05	185 50	107 50	668 05
6	48	40	27	.....	.....	1240 68	226 90	322 50	1790 08
17	65	35	71	759059 67	511734 00	1832 10	1180 90	710 00	3723 90
41	194	82	211	3461731 00	317563 00	4822 10	2881 50	2617 00	10320 60
241	1475	930	1358	6504340 68	5584604 35	36894 96	21131 90	13522 01	71549 56

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the different year ending 31st

County or District.	County Town.	Office.	Officers.	Amount Earned.	Salary paid by the Government.
				$ c.	$ c.
Algoma	Sault Ste. Marie	Sheriff	W. H. Carney	2094 74	1000 00
		Surrogate Judge	Judge McCrea	34 00	
		Local Master	"	21 40	
		District Attorney	J. J. Kehoe	237 00	
		Clerk of the Peace	"	374 60	800 00
		Local Registrar	T. A. P. Towers	24 00	150 00
		District Court Clerk	"	393 06	600 00
		Surrogate Registrar	"	81 90	
Brant	Brantford	Sheriff	Wm. Watt, jun	1887 57	*
		Surrogate Judge	Judge Jones	Commuted at	
		Local Master	"	Commuted at	
		County Attorney	G. R. VanNorman, Q.C.	1118 29	
		Clerk of the Peace	"	955 08	
		Local Registrar	W. B. Rubidge	425 45	675 00
		County Court Clerk	"	775 00	
		Surrogate Registrar	"	791 90	
Bruce	Walkerton	Sheriff	W. Sutton	3471 64	
		Surrogate Judge	Judge Kingsmill	Commuted at	
		Local Master & Deputy Registrar	W. A. McLean	Commuted at	
		County Attorney	Thos. Dixon	722 20	
		Clerk of the Peace	"	1614 08	
		Deputy Clerk of the Crown	Wm. Gunn	300 00	450 00
		County Court Clerk	"	986 50	
		Surrogate Registrar	"	902 38	
Carleton	Ottawa	Sheriff	John Sweetland	6531 31	
		Surrogate Judge	Judge Ross	Commuted at	
		Local Master	W. M. Matheson	2481 85	
		Deputy Registrar	"	774 41	
		County Attorney	Robert Lees, Q.C	367 18	

* From May 1st.

County Judicial Officers in the Province of Ontario, earned and received during the December, 1891.

Total Salary and Earnings.	Total Earnings and Salary in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average of Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
3094 74	3094 74	3011 12	319 48	3330 60	3330 60	1552 05	1778 45	1542 69	3312 09	1898 14
34 00	.....	34 00	.....	34 00	....	....	.....	.....	27 90	27 90
21 40	55 40	21 40	1 90	23 30	57 30	.....	57 30	55 40	40 90	40 88
237 00	.....	149 00	75 00	224 00	.....	.....	224 00	....	423 11	423 11
1174 60	1411 60	1023 28	183 61	1206 89	1430 89	13 00	1193 89	1417 89	877 47	868 04
174 00	.....	174 00	.....	174 00	.....	25 00	149 00	.....	220 90	212 90
993 06	.....	993 06	46 39	1039 45	.....	25 00	1014 45	.....	892 42	875 78
81 90	1248 96	81 90	.....	81 90	1295 35	.....	81 90	1198 96	56 16	53 96
.....	1887 57	1679 67	.....	1679 67	1679 67	709 70	969 97	1177 87	*.....	.....
.....	.....	360 00	.....	360 00	.... .	.....	360 00	....	†.....	.....
.....	.....	577 00	.....	577 00	.....	25 00	†552 00	.....	†	.....
1118 29	.....	1118 29	.....	1118 29	.....	46 00	1072 29	....	993 20	984 00
955 08	2073 37	955 08	.....	955 08	2073 37	56 00	899 08	1971 37	1107 88	1085 18
1100 45	.....	1100 45	.... ..	1100 45	.....	208 66	891 79	.....	1313 42	1080 46
775 00	.....	761 80	.....	761 80	.....	183 06	578 74	.....	820 21	661 89
791 90	2667 35	784 00	.....	784 00	2646 25	151 01	632 99	2124 62	735 92	605 42
.....	3471 64	3188 41	391 13	3579 54	3537 54	1122 57	2456 97	2349 07	4319 86	3046 49
.....	... .	408 00	.....	408 00	. ....	.....	.....	408 00	†.....	.....
.....	.... .	850 00	... ..	850 00	.....	5 00	845 00	845 00	†.....	.....
722 20	.....	449 00	90 80	539 80	.....	22 00	517 80	.. ..	861 50	816 45
1614 08	2336 28	1024 99	478 20	1503 19	2043 99	120 74	1382 45	2193 54	1727 97	1598 74
750 00	.....	628 00	.....	628 00	.... ..	205 00	425 00	....	674 35	633 35
986 50	.....	813 50	219 11	1032 61	.....	310 00	722 61	....	1084 03	586 00
902 38	2638 88	747 38	53 00	800 38	2460 99	300 00	500 38	1823 88	835 61	557 62
.....	6531 31	5944 58	589 11	6533 69	.....	3350 00	3183 69	3181 31	6114 63	3304 79
.....	.....	500 00	.....	.....	500 00	.....	.....	500 00	†..	.....
2481 85	.....	2463 66	199 89	2663 55	.....	51 15	2612 40	... ...	2477 18	2358 05
774 41	3256 26	772 61	16 20	788 81	3452 36	27 62	761 19	3177 49	730 17	674 67
367 18	.....	261 18	84 00	345 18	.....	.....	345 18	... .	594 11	563 12

* Not five years in office. † Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

County or District.	County Town.	Office.	Officer.	Amount Earned.	Salary paid by the Government.
				$ c.	$ c.
Carleton.—*Con.*	Ottawa	Clerk of the Peace	Robert Lees, Q.C.	1060 76	
		Deputy Cl'k of the Crown	J. P. Featherston	687 40	450 00
		County Court Clerk	"	1333 61	
		Surrogate Registrar	"	1328 90	
Dufferin	Orangeville	Sheriff	Thos. Bowles	2199 81	
		Surrogate Judge	Judge McCarthy	Commuted at	
		Local Master	"	336 36	
		County Attorney	E. Myers, Q.C.	156 00	
		Clerk of the Peace	"	520 53	
		Local Registrar	John McLaren	103 10	675 00
		County Court Clerk	"	349 50	
		Surrogate Registrar	"	425 80	
Elgin	St. Thomas	Sheriff	Dugald Brown	3205 57	
		Surrogate Judge.	Judge Hughes	693 00	
		Local Master	Robert Miller	1322 96	
		County Attorney	D. J. Donahue	852 86	
		Clerk of the Peace	"	898 68	
		Local Registrar	D. McLaws	264 50	675 00
		County Court Clerk	"	575 25	
		Surrogate Court	"	1017 27	
Essex	Sandwich	Sheriff	J. C. Iler	4006 11	
		Surrogate Judge	Judge Horne	275 00	
		Local Master	S. S. Macdonell, Q.C.	405 76	
		Deputy Registrar	"	242 00	
		County Attorney	"	649 76	
		Clerk of the Peace	"	764 70	
		Deputy Cl'k of the Crown	F. E. Marcon	901 55	450 00
		County Court Clerk	"	808 85	
		Surrogate Registrar	"	620 05	
Frontenac	Kingston	Sheriff	Wm. Ferguson	2069 51	

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Salary and Earnings.	Total Earnings and Salary in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average of Gross Earnings for years 1887 to 1891 both inclusive.	Average or net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1060 76	1427 94	856 42	134 26	990 68	1335 86	17 00	973 68	1410 94	1033 11	1017 19
1137 40	.....	1043 58	69 50	1113 08	.... ..	263 00	850 08	.....	1055 89	816 90
1333 61	.....	1154 41	63 10	1217 51	.....	263 00	954 51	.....	1184 51	977 36
1328 90	3799 91	1053 55	247 20	1300 75	3631 34	505 00	795 75	2768 91	1237 92	799 82
.....	2199 81	1770 84	527 28	2298 12	2298 12	699 81	1598 31	1500 00	2469 40	1700 60
168 00	.....	.....	.....	168 00	.....	.....	168 00	....	†.....	... .
336 36	504 36	319 56	21 32	340 88	508 88	12 36	328 52	492 00	175 16	167 08
156 00	.... ..	156 00	.....	156 00	.....	12 33	143 67	.....	*.....	.....
520 53	676 53	520 53	.....	520 53	676 53	32 69	487 84	631 51	*.....	.....
778 10	.....	776 90	.....	776 90	.....	21 60	755 30	.....	882 82	858 49
349 50	.....	345 40	3 90	349 30	.....	14 75	334 55	.....	357 48	340 66
425 80	1553 40	425 80	.....	425 80	1552 00	26 75	399 05	1490 30	329 97	310 77
.....	3205 57	2431 00	1273 45	3704 45	3704 45	1793 66	1910 79	1411 91	4041 85	2276 84
.....	.....	693 00	.....	.....	.... .	.....	.....	693 00	493 12	493 12
.....	1322 96	415 12	997 01	1412 43	1412 43	82 00	1330 43	1240 96	1110 34	1040 68
852 86	.....	659 98	121 28	781 26	.....	220 00	561 26	.....	1147 95	1046 10
898 68	1751 54	815 58	381 20	1196 78	1978 04	160 00	1036 78	1371 54	1030 20	958 73
939 50	... .	910 50	40 00	950 50	.....	45 00	905 50	....	1133 15	1048 01
575 25	.....	517 60	23 00	540 60	.....	89 00	451 60	.....	733 20	661 25
1017 27	2532 02	952 27	50 00	1002 27	2493 37	150 00	852 27	2248 02	921 07	784 77
.....	4006 11	3495 11	500 00	.....	3995 11	1400 75	2594 36	2605 36	4451 31	2829 06
.....	.....	275 00	.....	....	....	.....	....	275 00	371 70	371 70
405 76	.....	252 56	.....	252 56	.....	.....	252 56	.....	596 91	581 87
242 00	.....	242 00	.....	242 09	.....	.....	242 00	.....	261 48	259 38
649 76	.....	516 76	191 90	708 66	.....	153 50	555 16	.....	507 02	461 68
764 70	2062 22	497 34	290 40	787 74	1991 05	586 95	200 82	1321 77	840 08	713 19
1351 55	.....	1351 55	.....	1351 55	.....	25 00	1326 55	....	917 00	894 00
808 85	.....	808 85	.....	808 85	.....	25 00	783 75	.....	669 46	634 46
620 05	2780 45	620 05	.....	620 05	2780 45	60 70	559 35	2669 65	615 22	596 28
.....	2069 51	....	.....	2069 05	2069 05	477 72	.....	1591 79	2144 39	1674 26

* Not five years in office. † Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

County or District.	County Town.	Office.	Officer.	Amount earned.	Salary paid by the Government.
				$ c.	c.
Frontenac —*Con*	Kingston	Surrogate Judge	Judge Price	commuted at	
		Local Master.....	J. M. Machar, Q.C....	861 90	....
		County Attorney	*J. L. Whiting, Q.C*..	301 10	.....
		Clerk of the Peace	"	923 43	.....
		Local Registrar.....	Archibald McGill.... .	267 75	675 00
		County Court Clerk....	"	659 35	.....
		Surrogate Registrar....	"	1094 31	.....
Grey	Owen Sound.....	Sheriff	C. H. Moore.....	3298 66	.....
		Surrogate Judge.....	Judge Creasor	365 00	.....
		Local Master.....	Alfred Frost	192 40	.....
		County Attorney	"	293 30	.....
		Clerk of the Peace.....	Wm. Armstrong	1080 20	....
		Local Registrar.... ..	George Iuglis.....	180 30	750 00
		County Court Clerk....	"	846 70	....
		Surrogate Registrar....	"	836 85	.....
Haldimand	Cayuga	Sheriff	R. H. Davis	2204 80	.....
		Surrogate Judge	Judge Upper	284 30	....
		Local Master	"	59 00	....
		County Attorney	J. R. Martin.....	796 60	.....
		Clerk of the Peace	"	1349 36	.....
		Local Registrar.....	Jas. Mitchell	127 55	600 00
		County Court Clerk....	"	264 05	.....
		Surrogate Registrar....	"	657 20	.....
Halton	Milton	Sheriff	M. Clements	1641 70	.....
		Surrogate Judge	.....	260 50	.....
		Local Master.....	.....	.....	.....
		County Attorney.... .	T. G. Matheson	564 05	.....
		Clerk of the Peace	"	1050 97	.....
		Local Registrar	Walter A. Lawrence ..	96 55	600 00

* Appointed 3rd Oct., 1891.

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Earnings and Salaries.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average of Gross Earnings for years 1887 to 1891, both inclusive.	Average of Net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	.....	752 00	.....	752 00	.....	.....	.....	752 00	†.....	.....
.....	861 90	555 00	.....	551 00	551 00	100 00	441 00	761 00	*.....	.....
301 10	.....	301 10	171 00	471 10	.. ....	98 50	372 60	.....	434 75	334 40
923 43	1224 53	923 43	592 35	1515 78	1986 88	198 50	1317 28	927 53	1094 72	875 87
942 75	....	942 75	.....	942 75	.....	120 00	822 75	....	*.....	.....
659 35	.....	532 65	120 00	652 65	.....	270 00	382 65	....	*	.....
1094 31	2696 41	829 64	160 00	989 64	2585 04	430 00	559 64	1876 41	*.....	....
..... .	3298 66	2790 27	1014 49	3804 76	3804 76	1452 03	2352 73	1846 63	4168 79	2287 81
....	....	365 00	.....	.....	365 00	....	.....	365 00	*.....	.....
192 40	.....	122 40	86 16	208 56	..... .	.....	208 56	.....	235 41	235 41
293 30	485 70	216 90	38 00	254 90	463 46	14 40	240 50	471 30	321 35	299 38
1080 20	.....	506 67	573 58	1080 20	1080 20	.....	1080 20	1080 20	1530 77	1457 42
930 30	.....	905 30	19 75	925 05	.....	26 80	898 25	.....	916 01	823 75
846 70	.....	820 70	... .	820 70	.....	53 85	766 85	.....	831 23	784 48
836 85	2613 85	726 35	77 25	803 60	2549 35	272 60	531 00	2260 60	814 06	589 39
.....	2204 80	2086 05	38 91	2124 96	2124 96	381 80	1743 16	1823 00	2118 82	1633 09
284 30	.....	284 30	.....	284 30	.....	.....	284 30	.....	226 68	226 68
59 00	343 30	5 00	.... ..	5 00	289 30	.....	5 00	343 30	72 08	68 08
796 60	.....	532 58	36 00	568 58	.....	50 00	518 58	.....	569 47	529 47
1349 36	2145 96	822 94	358 04	1180 98	1749 56	400 00	780 98	1695 96	1209 36	929 36
727 55	.....	727 55	.....	727 55	.....	20 00	707 55	....	695 84	681 84
264 05	....	264 05	.....	264 05	.....	25 00	239 05	.....	249 17	332 17
657 20	1648 80	657 20	.....	657 20	1648 80	95 00	562 20	1508 80	607 92	528 52
.....	1641 70	1462 00	114 38	1576 38	1576 38	505 00	1071 38	1136 70	1617 38	1116 37
.....	260 50	... .	.....	.....	260 50	.... ..	.....	260 50	....	..... .
.....	. .. .	..... .	.....	.....	.....	.....	. ....	.....	.....	.....
564 05	.....	420 35	73 00	493 35	.. ....	8 50	484 85	....	....	.....
1050 97	1615 02	602 69	380 82	983 51	1476 86	22 16	961 35	1584 36	.....	.....
696 55	.....	696 55	.....	696 55	.....	168 00	528 55	....	.....	.....

* Not five years in office. † Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

County or District.	County Town.	Office.	Officer.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Halton —*Con* ..	Milton	County Court Clerk....	Walter A. Lawrence...	327 85	.....
		Surrogate Registrar....	" ..	512 75	.....
Hastings	Belleville	Sheriff	Wm. Hope.....	4837 09	.....
		Surrogate Judge	Judge Lazier.....	commuted at	
		Local Master and Deputy Registrar	S. S. Lazier	commuted at	
		County Attorney	G. E. Henderson, Q.C..	536 43	.....
		Clerk of the Peace	" ..	1323 22	.....
		Deputy Clerk of the Crown	A. G. Northrup	609 33	450 00
		County Court Clerk....	"	1216 12	.....
		Surrogate Registrar....	"	776 12	.....
Huron	Goderich	Sheriff	R. Gibbons...	3473 74	.....
		Surrogate Judge	Judge Toms	commuted at	
		Local Master and Deputy Registrar	S. Malcomson	commuted at	
		County Attorney	Ira Lewis.....	607 53	.....
		Clerk of the Peace	"	1345 70	.....
		Deputy Clerk of the Crown	D. McDonald	385 30	500 00
		County Court Clerk....	"	738 95	.....
		Surrogate Registrar....	"	1673 90	.....
Kent	Chatham	Sheriff	John Mercier.....	4019 34	.....
		Surrogate Judge	Judge Bell	438 50	.....
		Local Master and Deputy Registrar	R. O'Hara	commuted at	
		County Attorney.....	Wm. Douglas, Q.C	1037 09	.....
		Clerk of the Peace	"	1226 30	.....
		Deputy Clerk of the Crown	W. A. Campbell	40 00	450 00
		County Court Clerk....	"	690 50	... .
		Surrogate Registrar ..	"	687 25	.... ..
Lambton	Sarnia	Sheriff	Jas. Flintoft	3001 29	.....

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Earnings and Salaries.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
327 85	.....	327 85	... .	327 85	....	168 00	159 85	.....	... .	....
512 75	1537 15	512 75	.. ....	512 75	1537 15	168 00	344 75	1033 15	....	.....
.....	4837 09	3584 32	940 86	4525 18	4525 18	2310 86	2214 32	2526 23	4624 31	2668 56
.....	348 80	.....	.....	.....	348 80	.....	348 80	348 80	†..... ..	..... .
... ...	3000 00	.....	.....	.....	3000 00	450 00	2550 00	2550 00	†.....	.....
536 43	.....	502 43	64 50	566 93	.....	100 00	466 93	.....	592 65	502 65
1323 22	1859 65	856 54	517 23	1373 77	1940 70	200 00	1700 77	1559 65	1581 23	1291 23
1059 33	..... .	... ...	.....	1059 33	.....	200 00	859 33	... .	1121 22	985 62
1216 12	.....	.....	....	1216 12	..... .	200 00	1016 12	....	1348 86	1166 66
776 12	3052 07	....	.....	776 12	3052 07	250 00	526 12	2402 07	745 02	531 02
.....	3473 74	3052 01	272 48	3324 49	3324 49	1600 60	1723 89	1873 14	3946 62	2162 14
792 00	.... ..	779 75	. .....	... . .	779 75	.....	.....	779 75	†commutation 1st Apr	
.....	1250 00	.....	.....	....	1250 00	.....	.....	1250 00	.....	.....
607 53	.....	419 47	94 47	513 94	.....	40 00	473 94	.....	628 15	572 01
1345 70	1953 23	1255 30	59 85	1315 15	1829 09	640 00	675 15	1273 23	1463 12	839 12
885 30	.....	885 30	.....	885 30	.. ....	300 00	585 30	....	1147 05	927 65
738 95	....	738 95	.....	738 95	.....	236 50	502 45	.....	974 21	768 54
1673 90	3298 15	1673 90	.....	1673 90	3298 15	450 00	1223 90	2311 65	1370 81	1030 21
.....	4019 34	3212 40	1112 16	4324 56	4324 56	1224 86	3099 70	2794 48	4160 13	2447 55
....	438 50	.....	....	....	438 50	.....	.....	438 50	447 57	447 57
.....	1600 00	.....	.....	.....	1600 00	.....	.....	1600 00	....	†.....
1037 09	.....	900 00	182 09	1082 09	....	100 00	982 09	.....	1102 59	1042 59
1226 30	2263 39	915 93	315 79	1267 72	2349 81	150 00	1117 72	2013 39	1344 26	1188 26
490 00	....	490 00	.....	490 00	.....	150 00	340 00	....	554 00	444 10
690 50	.....	600 00	.....	600 00	.....	150 00	450 00	.....	690 36	305 76
687 25	1867 75	640 00	.....	640 00	1730 00	150 00	490 00	1417 75	644 44	594 64
. .....	3001 29	2335 70	136 53	2472 23	2472 23	1082 16	1390 07	1919 13	3438 03	2089 34

† Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Lambton.—*Con*...	Sarnia	Surrogate Judge	Judge Robinson....	558 50	.....
		Local Master.....	"	166 26	.....
		County Attorney	J. P. Bucke.....	979 65	.....
		Clerk of the Peace	"	1370 85	.....
		Local Registrar.	W. R. Gemmill....	274 00	675 00
		County Court Clerk.	"	629 30	.....
		Surrogate Registrar.....	"	837 35	.....
Lanark.....	Perth	Sheriff	Jas. Thompson.....	1573 25	.....
		Surrogate Judge	Judge Senkler	285 00	.....
		Local Master.....	"	388 59	.....
		County Attorney	E. G. Malloch.....	314 47	.....
		Clerk of the Peace	"	541 00	.....
		Local Registrar.....	Charles Rice	192 40	675 00
		County Court Clerk.....	"	309 20	.....
		Surrogate Registrar.....	"	528 00	.....
Leeds and Grenville	Brockville	Sheriff	James Smart.....	3211 64	.....
		Surrogate Registrar.....	Judge Macdonald..	Commuted at	
		Local Master.....	J. D. Buell	203 19	.....
		Deputy Registrar.....	"	91 40	.....
		County Attorney	"	325 44	.....
		Clerk of the Peace	"	649 84	.....
		Deputy Clerk of the Crown.	S. Reynolds... ...	256 89	500 00
		County Court Clerk	"	752 05	.....
		Surrogate Registrar.....	"	1277 47	.....
Lennox and Addington....	Napanee	Sheriff	O. T. Pruyn	1906 04	.....
		Surrogate Judge	Judge Wilkinson...	Commuted at	
		Local Master.....	S. S. Lazier.....	452 60	.....
		County Attorney	A. L. Mordon.....	81 95	.....
		Clerk of the Peace	"	553 80	.....
		Local Registrar.....	W. P. Deroche	327 30	600 00

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Salary and Earnings.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officers during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
558 50	.....	.....	.....	558 50	.....	.....	558 50	.....	414 10	414 10
166 26	724 76	145 06	.....	145 06	703 56	10 00	135 56	714 76	121 93	119 93
979 65	.....	772 00	213 06	985 06	.....	13 00	972 06	.....	891 08	881 36
1370 85	2350 50	1273 05	99 70	1372 75	2357 81	6 66	1366 09	2330 84	1366 78	1355 85
949 00	.....	.....	.....	949 00	.....	10 00	939 00	.....	936 53	926 93
629 30	.....	.....	.....	629 30	.....	15 00	614 30	.....	568 20	554 60
837 35	2415 65	.....	.....	837 35	2415 65	20 00	817 35	2370 65	717 53	702 73
.....	1573 25	1195 70	530 87	1726 57	1726 57	475 49	1251 08	1097 76	1646 00	1144 87
285 00	.....	285 00	.....	285 00	.....	.....	285 00	.....	461 40	461 40
388 59	673 59	39 20	265 60	304 80	589 80	.....	304 80	673 59	331 47	329 08
314 47	.....	261 22	57 65	318 87	.....	35 00	283 87	.....	520 95	491 83
541 00	855 47	285 23	253 70	538 93	857 80	45 00	493 93	775 47	544 97	504 97
867 40	.....	844 00	80 90	924 90	.....	5 30	919 60	.....	875 26	867 22
309 20	.....	233 30	138 00	371 30	.....	6 35	364 95	.....	383 20	375 05
528 00	1704 60	409 35	86 40	495 75	1791 95	7 65	488 10	1685 30	596 69	583 54
.....	3211 64	2603 14	661 40	3264 54	3264 54	1115 87	2148 67	2095 77	3842 77	2693 32
.....	480 00	.....	.....	.....	480 00	.....	.....	480 00	†	.....
203 19	.....	62 77	155 60	217 37	.....	.....	217 37	.....	279 52	270 62
91 40	.....	49 55	10 10	59 65	.....	.....	59 65	.....	128 17	128 17
325 44	.....	224 36	151 04	375 40	.....	.....	375 40	.....	369 02	368 72
649 84	1269 87	391 47	315 70	707 17	1359 59	87 00	620 17	1182 87	769 46	670 29
756 89	.....	756 89	.....	756 89	.....	5 00	751 89	.....	755 38	744 88
752 05	.....	752 05	.....	752 05	.....	5 00	747 05	.....	705 84	692 94
1277 47	2786 41	1277 47	.....	1277 47	2786 41	13 00	1264 47	2763 41	1115 64	1069 03
.....	1906 04	997 58	688 07	1685 65	1685 65	1159 17	526 48	746 87	2344 81	1053 39
.....	400 00	.....	.....	.....	400 00	.....	.....	400 00	†	† .....
.....	452 60	380 00	98 00	473 00	478 00	75 00	403 00	377 60	513 04	444 04
81 95	.....	45 65	89 00	134 65	.....	11 00	123 65	.....	114 31	105 29
552 80	634 75	311 34	273 00	584 34	718 99	68 50	515 84	555 25	610 10	539 20
927 20	.....	892 20	39 70	931 90	.....	34 84	897 06	.....	868 90	856 97

†Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Lennox and Addington.—*Con.*	Napanee	County Court Clerk	W. P. Deroché	372 20	
		Surrogate Registrar	"	426 00	
Lincoln	St. Catharines.	Sheriff	Thomas C. Dawson	2096 95	
		Surrogate Judge	Judge Senkler	Commuted at	
		Local Master	F. W. McDonald	815 41	
		Deputy Registrar	"	247 90	
		County Attorney	John McKeown	259 72	
		Clerk of the Peace	"	1019 00	
		Deputy Clerk of the Crown.	J. Clench	308 04	450 00
		County Court Clerk	"	505 95	
		Surrogate Registrar	"	546 65	
Manitoulin	Gore Bay	District Court Clerk	William S. Francis.	120 60	250 00
		Surrogate Registrar	"	30 30	
Middlesex	London	Sheriff	William Glass	4283 31	
		Surrogate Judge	Judge Elliott	Commuted at	
		"	Judge Davis		200 00
		Local Master	James Shauly	715 14	
		Deputy Registrar	"	626 40	
		County Attorney	Chas. Hutchison	2334 49	
		Clerk of the Peace	"	1615 70	
		Deputy Clerk of the Crown.	John Macbeth	572 55	500 00
		County Court Clerk	"	1564 40	
		Surrogate Registrar	"	1927 70	
Muskoka	Bracebridge	Sheriff	James W. Bettes	1308 30	500 00
		Surrogate Judge	Judge Mahaffy	32 00	
		Local Master	"	107 70	
		District Attorney	Thomas Johnson	240 80	
		Clerk of the Peace	"	440 12	
		Local Registrar	Isaac Huber	60 80	
		District Court Clerk	"	78 80	600 00
		Surrogate Registrar	"	64 88	

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Salary and Earnings.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.		Average of Gross Earnings for years 1887 to 1891, both inclusive.		Average of net amount due to or received by officers during these years.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.		$ c.		$ c.	
372 20	.....	322 20	25 30	347 50	.....	21 00	326 50	.....		406 15		396 99	
426 00	1725 40	415 50	9 60	425 10	1704 50	4 41	420 69	1665 15		385 44		381 10	
.....	2096 95	1853 08	566 71	2419 79	2419 79	485 56	1934 23	1611 39		2571 55		1696 31	
.....	566 00	.....	.....	.....	566 00	.....	.....	566 00	†	.....		.....	
815 41	.....	475 11	239 98	715 09	.....	.....	715 09	.....		828 26		813 28	
247 90	1063 31	198 11	159 48	357 59	1072 68	.....	1072 68	1063 31		343 19		335 19	
259 72	.....	259 72	.....	259 72	.....	10 00	249 72	.....		349 61		296 23	
1019 00	1278 72	1019 00	.....	1019 72	1278 72	212 48	806 52	1056 24		1206 01		997 90	
758 04	.....	621 14	17 20	638 34	.....	23 74	614 60	.....		758 85		740 88	
505 95	.....	411 35	79 18	490 53	.....	9 20	481 33	.....		520 33		512 77	
546 65	1810 64	541 75	2 90	544 65	1673 52	18 96	525 69	1758 74		636 87		588 23	
370 60	.....	.....	.....	.....	.....	17 50	353 10	.....	*	.....	*	.....	
30 30	400 90	.....	.....	.....	400 90	.....	30 30	383 40	*	.....	*	.....	
.....	4283 31	3944 72	353 02	.....	4297 74	1901 00	2396 74	2382 31		4946 45		2527 85	
.....	1000 00	.....	.....	.....	1000 00	.....	.....	1000 00	†	.....		.....	
.....	.....	.....	.....	.....	200 00	.....	.....	200 00	*	.....		.....	
715 14	.....	294 64	92 06	386 70	.....	27 95	358 75	.....		1033 27		948 42	
626 40	1341 54	.....	.....	626 40	1013 10	.....	626 40	1313 59		695 15		616 49	
2334 49	.....	1692 02	861 95	2553 97	.....	709 42	1844 55	.....		2298 51		1882 50	
1615 70	3950 19	991 51	649 46	1640 97	4194 94	527 30	1113 67	2713 47		1904 94		1383 03	
1072 55	.....	907 25	36 15	943 40	.....	330 00	613 40	.....		1200 79		909 14	
1564 40	.....	1529 05	.....	1529 05	.....	330 00	1199 05	.....		1930 95		1539 30	
1927 70	4564 65	1927 70	.....	1927 70	4400 15	330 00	1597 70	3574 65		1821 98		1476 19	
1808 30	1808 30	831 24	382 16	1214 40	1214 40	416 55	791 85	1391 75	*	.....		.....	
32 00	.....	.....	.....	32 00	.....	.....	32 00	.....	*	.....		.....	
107 70	139 70	.....	.....	107 70	139 70	3 00	104 70	136 70	*	.....		.....	
240 80	.....	128 80	203 40	332 20	.....	.....	332 20	.....	*	.....		.....	
440 12	680 92	234 32	229 32	463 64	795 84	79 15	384 49	601 77	*	.....		.....	
60 80	.....	60 80	.....	60 80	.....	4 30	56 50	.....	*	.....		.....	
678 80	.....	678 80	.....	678 80	.....	3 25	675 55	.....	*	.....		.....	
64 88	804 48	64 88		64 88	804 48	2 42	62 46	794 51	*	.....		.....	

*Not five years in office. †Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Norfolk	Simcoe	Sheriff	E. Deedes	2482 23	
		Surrogate Judge	Judge Robb	332 10	
		County Attorney	J. H. Ansley	363 40	
		Clerk of the Peace	"	891 00	
		Local Master	C. C. Rapelge	36 50	
		Local Registrar	"	36 00	675 00
		County Court Clerk	"	472 11	
		Surrogate Registrar	"	718 25	
Northumberland and Durham	Cobourg	Sheriff	I. O. Proctor	3879 02	
		Surrogate Judge	Judge Benson	commuted at	
		Local Master	J. H. Dumble	629 31	
		County Attorney	J. W. Kerr	497 60	
		Clerk of the Peace	"	842 06	
		Local Registrar	John Fisher	188 00	750 00
		County Court Clerk	"	866 35	
		Surrogate Registrar	"	1441 50	
Ontario	Whitby	Sheriff	J. F. Paxton	2882 81	
		Surrogate Judge	Judge Burnham	commuted at	
		Local Master	Judge Dartnell	456 70	
		County Attorney	J. E. Farewell	531 35	
		Clerk of the Peace	"	1090 20	
		Local Registrar	L. T. Barclay	175 50	675 00
		County Court Clerk	"	665 05	
		Surrogate Registrar	"	923 40	
Oxford	Woodstock	Sheriff	James Brady	2434 10	
		Surrogate Judge	Judge Finkle	750 50	
		Local Master	H. B. Beard, Q.C	415 56	
		Deputy Registrar	"	342 16	
		County Attorney	F. R. Ball, Q.C	430 40	
		Clerk of the Peace	"	735 52	

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Earnings and Salaries.	Total Earnings and Salaries in all his Offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.... ..	2482 23	1695 54	620 94	2316 48	2316 48	1053 17	1263 31	1429 06	2668 33	1433 46
.....	332 10	.....	. .. ..	.....	332 10	.....	.....	332 10	*.....	.....
363 40	.. ..	363 40	.....	363 40	....	.....	363 40	.....	430 56	403 84
891 00	1254 40	883 20	277 76	1160 96	1524 36	28 85	1132 01	1225 55	947 60	929 02
36 50	....	18 10	73 70	91 80	....	1 90	90 00	.....	254 07	256 20
711 00	.. ....	694 00	.....	694 00	... ..	0 25	693 75	.....	841 94	841 44
472 11	.....	407 29	127 51	534 80	.... ..	1 40	533 40	.....	489 20	483 83
718 25	1937 86	514 95	66 20	581 15	1901 75	4 75	576 40	1929 66	607 52	602 22
.....	3879 02	2149 57	1822 02	4271 59	4271 59	2277 06	1994 53	1601 96	4938 19	2676 16
... . ..	600 00	.....	.... ..	... ..	600 00	.....	.....	600 00	†.....	.....
.....	629 31	336 17	338 18	674 35	674 35	20 00	654 35	609 31	*..... ..	....
497 60	.....	281 40	110 60	392 00	.....	100 00	292 00	.....	933 63	773 63
842 06	1339 66	464 85	350 75	815 55	1207 55	200 00	615 55	1039 66	1125 94	892 94
938 00	.....	841 60	136 35	977 95	.....	240 00	737 95	.....	1136 08	938 48
866 35	.....	496 26	251 01	747 27	.....	260 00	487 27	.. ..	880 83	555 57
1441 50	3245 85	1020 26	273 15	1293 41	3018 63	130 00	1163 41	2615 85	1290 00	1152 73
.. . ..	2882 81	2319 37	961 90	3281 27	3281 27	1339 71	1941 56	1543 16	2973 05	1390 63
.....	540 00	.....	.....	... . ..	540 00	. .....	.....	540 00	†.....	....
.....	456 70	. . ..	.....	.....	456 70	30 00	426 70	426 70	527 44	413 44
531 35	.....	370 80	196 90	567 70	.....	147 80	419 90	.....	812 92	640 40
1090 20	1621 55	626 92	543 95	1170 87	1738 57	274 50	896 37	1199 25	1334 13	1034 34
850 50	.....	... .	.....	850 50	....	15 00	835 50	.....	867 78	856 28
665 05	.....	.....	10 50	675 55	.....	10 00	665 55	.....	683 68	671 39
923 40	2438 95	.....	.. ... .	923 40	2449 45	71 05	852 40	2342 95	928 25	890 15
... ..	2434 10	2168 76	.....	2168 76	2168 76	751 02	1417 74	1683 08	*.....	.....
.....	750 50	.. ..	.....	.....	750 50	..... .	.. ....	750 50	680 30	680 30
415 56	... ..	.....	... ..	415 56	.....	.... ..	415 56	.....	426 46	426 46
342 16	757 72	.....	.....	342 16	757 72	... .	342 16	757 72	278 18	278 18
430 40	.. ....	311 80	104 50	416 30	... .	16 00	400 30	.....	372 70	1354 90
735 52	1165 92	481 38	307 55	788 93	1205 23	12 00	776 93	1137 92	894 36	.....

*Not five years in office. †Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Oxford.—*Con*...	Woodstock	Deputy Clerk of the Crown	James Canfield	509 20	450 00
		County Court Clerk....	"	843 34	.....
		Surrogate Registrar....	"	1291 77	.....
Parry Sound ..	Parry Sound	Sheriff	Henry Armstrong	951 06	500 00
		Surrogate Judge	Judge Mahaffy	14 50	.....
		Local Master..... ..	See under Muskoka...		
		District Attorney.....			
		Clerk of the Peace			
		Local Registrar.....	R. H. Stewart.....	5 80	600 00
		District Court Clerk ..	"	17 35	.....
		Surrogate Registrar....	"	38 90	.....
Peel	Brampton	Sheriff	Robert Broddy	2220 94	....
		Surrogate Judge.....	Judge Scott	commuted a	
		Local Master.....	"	133 30	.....
		County Attorney	W. H. McFadden	343 30	.....
		Clerk of the Peace	"	1061 05	.....
		Local Registrar.....	J. A. Austin	123 47	600
		County Court Clerk....	"	306 59	.....
		Surrogate Registrar....	"	701 35	.....
Perth	Stratford	Sheriff	John Hossie.....	2777 54	. .. ..
		Surrogate Judge	Judge Woods.....	711 80	.....
		Local Master..	John E. Harding, Q.C.	489 00	.....
		County Attorney	John Idington, Q.C....	482 10	.....
		Clerk of the Peace	"	639 47	.....
		Local Registrar.....	Jas. McFadden.....	831 90	675 00
		County Court Clerk....	"	634 10	.... ..
		Surrogate Registrar....	"	1105 75	....
Peterborough ..	Peterborough	Sheriff	Jas. A. Hall	2362 47	.....
		Surrogate Judge	Judge Weller	321 00	.....

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Earnings and Salaries.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
959 20	.....	789 50	262 50	1052 00	.....	98 40	953 60	.....	974 33	928 06
843 34	.....	597 00	187 00	784 00	.....	11 69	712 31	.....	839 76	815 19
1291 77	3094 31	976 00	301 00	1277 00	3113 00	31 30	1245 70	2952 92	1245 25	1183 30
.....	1451 06	1102 81	394 81	1497 62	1497 62	426 29	1071 33	1024 77	*.....	.....
....	.....	.....	.. ..	.. ..	..... .	.....	.....	.....	.....	.....
605 80	.....	.....	.....	605 80	.....	.....	.....	.....	*.....	.....
17 35	.....	.... ..	.. ..	17 23	... .	.....	.....	.....	*.....	.....
38 90	662 05	.....	.. ..	38 90	662 05	.....	.....	662 05	*.....	.....
.....	2220 94	1820 94	329 02	2149 96	2149 96	1244 49	905 47	976 45	2431 31	1188 42
240 00	.....	.....	.....	240 00	.....	.....	240 00	.....	†.....	.....
.....	... ..	.... ..	... .	.....	.. ....	.....	.....	.....	.....	.....
343 30	.....	235 30	8 60	243 90	.....	15 00	228 90	.....	280 67	268 07
1061 05	1404 35	863 18	102 85	966 03	1209 93	25 00	941 03	1364 35	910 93	892 93
723 47	.. ..	723 47	.....	723 47	.....	39 45	684 02	.....	724 33	697 82
306 59	.....	292 89	7 95	300 84	.....	5 65	294 19	.....	331 91	324 14
701 35	1731 41	670 51	90	671 41	1695 72	27 00	644 41	1659 31	686 66	664 46
.....	2777 54	2025 57	558 57	2584 14	2584 14	1368 35	1215 79	1409 19	3319 55	2028 31
.....	711 80	.....	.....	.....	711 80	.....	.....	711 80	672 48	672 48
.....	489 00	340 00	.....	.....	340 00	.....	.....	489 00	*.....	.....
482 10	.....	367 00	74 60	441 60	... . ..	18 00	423 60	.....	541 05	512 08
639 47	1121 57	314 52	296 26	610 78	1052 38	245 00	365 78	858 57	702 95	449 79
1506 90	.....	1493 65	.....	1493 65	.....	427 61	1066 04	.....	1362 78	1157 45
634 10	.....	616 90	.....	616 90	.....	231 20	385 70	....	681 42	525 18
1105 75	3246 75	1099 05	.....	1099 05	3209 60	250 00	849 05	2337 94	1066 11	906 11
.....	2362 47	2198 63	109 38	2308 01	2308 01	489 91	1818 10	1872 56	2238 86	1790 84
.....	321 00	.....	....	321 00	.....	.....	.....	321 00	401 60	401 60

*Not five years in office. †Commuted on average of previous five years.

APPENDIX F.—Shedule shewing Return of Fees and Emoluments of the

County or District.	County Town.	Office.	Officer.	Amount Earned.	Salary paid by the Government.
				$ c.	$ c.
Peterboro'—*Con*..	Peterboro'.....	Local Master	Judge Weller..... ..	319 25	.....
		County Attorney	Robert E. Wood.....	310 70	....
		Clerk of the Peace	"	788 07	.....
		Local Registrar.....	John Maloney	245 40	675 00
		County Court Clerk.....	"	486 65	.....
		Surrogate Registrar.....	"	630 95	.....
Prescott & Russell	L'Orignal	Sheriff	Albert Hagar.....	2384 56	500 00
		Surrogate Judge	Judge O'Brian	325 00	.....
		Local Master.....	"	75 20	.....
		County Attorney	John Maxwell.....	150 42	.....
		Clerk of the Peace	"	783 46	.....
		Local Registrar	John Fraser.....	131 05	675 00
		County Court Clerk.....	"	368 75	.....
		Surrogate Registrar.....	"	380 98	.....
Prince Edward ...	Picton	Sheriff	Jas. Gillespie.....	1528 13	200 00
		Surrogate Judge.....	Judge Merrill	115 00	.....
		Local Master.....	Nehemiah Gilbert....	315 50	.....
		County Attorney	Philip Low, Q.C.....	90 55	.....
		Clerk of the Peace.....	"	386 72	.....
		Local Registrar	John Twigg	180 40	600 00
		County Court Clerk	"	372 60	.....
		Surrogate Registrar	"	328 94	.....
Rainy River.....	Rat Portage...	Sheriff	Wm. H. Carpenter..	947 82	1000 00
		Surrogate Judge.....	Judge Hamilton.....	.....	.....
		Local Master	See under Thunder Bay.		
		District Attorney.			
		Clerk of the Peace			
		District Court Clerk	Frank J. Apjohn	89 00	300 00
		Surrogate Registrar.....	"	19 20	.....

different County Judicial Officers in the Province of Ontario. etc.—*Continued.*

Total Earnings and Salary.	Total Earnings and Salary by officer in all his offices.	Amount received for present year.	Amount received for previous years.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by Officer by virtue of all his offices.	Average of gross earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c	$ c.	$ c.
319 25	640 25	.....	.... ..	319 25	640 25	.....	640 25	640 25	463 60	463 60
310 70	... .	218 30	87 00	305 30	.....	8 00	297 30	.....	252 16	252 16
788 07	1098 77	381 47	371 66	753 13	1058 43	22 50	730 63	1068 27	825 80	804 90
920 40	.. ..	920 40	.....	.....	....	90 00	830 40	....	934 91	852 91
486 65	.....	486 65	.....	....	.....	75 00	411 65	.....	515 29	442 29
630 95	2038 00	630 95	.....	.....	2038 00	80 00	550 95	1793 00	519 05	463 05
2884 56	2884 56	2391 77	668 12	3059 89	3059 89	734 53	2325 36	2150 03	2745 12	2018 64
325 00	.....	....	..... .	325 00	.....	.. ....	325 00	.....	*.....	. .....
75 20	400 20	46 50	54 50	101 09	426 00	.....	101 00	400 20	*.....	.....
150 42	.....	117 42	.....	117 42	.....	17 00	100 42	....	174 65	137 45
783 46	933 88	778 46	.....	778 46	895 88	10 00	768 46	906 88	787 66	752 36
806 05	.. ...	785 60	.....	785 60	.....	70 80	714 80	.....	779 69	751 38
368 75	.....	359 20	.....	359 20	.....	20 00	339 20	.....	311 05	286 75
380 98	1555 78	346 54	73 21	419 75	1564 55	101 30	318 45	1366 68	310 56	228 30
1728 13	1728 13	1219 06	299 35	1518 41	1518 41	841 93	676 48	886 20	1757 46	761 66
.....	115 00	.....	.....	.. .. ..	115 00	.....	.....	115 00	*.....	.....
.....	315 50	286 15	49 91	335 06	335 06	35 00	300 06	280 50	*.....	.....
90 55	.....	36 30	54 25	90 55	.....	4 00	86 55	... .	64 53	61 41
386 72	477 27	231 39	155 58	386 97	477 52	11 09	375 88	462 18	517 76	504 66
780 40	.....	776 40	.....	776 40	.....	.....	776 40	.. ..	756 64	756 64
372 60	.....	329 65	64 00	393 65	. ... ..	.....	393 65	.....	428 51	428 51
328 94	1481 94	315 39	13 80	329 19	1499 34	.... ..	329 19	1481 94	403 64	403 64
. ... ..	1947 82	1674 84	422 39	2097 23	2097 23	370 90	1726 33	1576 92	.....	.....
... .	.....	.....	.... ..	.....	.....	... .	... .	. ...	*.....	.....
389 00	.... ..	.....	.....	.....	.....	.....	389 00	. .. .	632 89	632 89
19 20	408 20	.. ..	.....	.....	408 20	.....	19 20	408 20	11 50	11 50

* Not five years in office.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount earned.	Salary paid by the Government.
				$ c.	$ c.
Renfrew	Pembroke	Sheriff	Wm. Moffatt.....	2463 06	.....
		Surrogate Judge.....	Judge Deacon.....	commuted at	
		Local Master..... ...	"	154 50	.....
		County Attorney.....	J. H. Metcalfe	280 65	... .
		Clerk of the Peace.....	"	678 82	....
		Local Registrar	A. Thompson.....	61 00	600 00
		County Court Clerk	"	410 92	....
		Surrogate Registrar	"	432 30	.....
Simcoe	Barrie	Sheriff	O. J. Phelps	4514 20	.....
		Surrogate Judge.....	Judge Ardagh.....	commuted at	
		Local Master.....	J. R. Cotter	581 80	....
		Deputy Registrar..	"	428 10	.....
		County Attorney	"	896 18	. .. ...
		Clerk of the Peace...	"	1149 08	.....
		Deputy Clerk of the Crown	J. McL. Stevenson ..	390 26	500 00
		County Court Clerk	" ..	1274 02	.....
		Surrogate Registrar	" ..	1271 28	.....
Stormont, Dundas and Glengarry..	Cornwall.....	Sheriff	D. E. McIntyre	3293 97	.....
		Surrogate Judge..... ..	Judge Pringle.....	462 50	.....
		Local Master..... ..	"	860 00	.....
		County Attorney	James Dingwall	259 60	....
		Clerk of the Peace..	"	684 35	.....
		Local Registrar	J. A. McDougald....	179 30	750 00
		County Court Clerk	"	755 88	.....
		Surrogate Registrar	*Vacant*.....	782 69	.....
Thunder Bay	Port Arthur...	Sheriff	Alex. W. Thompson.	2126 80	800 00
		Surrogate Judge.....	Judge Hamilton	8 50	....
		Local Master.....	" ...	.....	.....
		District Attorney	A. R. Lewis, Q.C....	147 20	.....
		Clerk of the Peace	"	356 87	....

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Earnings and Salary.	Total Earnings and Salary by officer in all his offices.	Amount received for present year.	Amount received for previous years.	Total receipts.	Total receipts by officer from all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by officer by virtue of all his offices.	Average of gross earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officer during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
.....	2463 06	2297 32	246 82	2544 14	2544 14	745 63	1798 51	1717 43	*	.....
264 00	.....	.....	.....	.....	.....	.....	.....	....	*	.....
154 50	418 50	.....	.....	.....	418 50	.....	.....	418 50	110 20	109 38
280 65	.....	251 15	.....	251 15	.....	9 00	242 15	....	223 58	211 83
678 82	959 47	442 94	251 44	694 38	945 53	65 63	628 75	884 84	725 08	657 29
661 00	.....	661 00	.....	661 00	.....	5 00	656 00	.....	676 52	671 02
410 92	.....	410 92	.....	410 92	.....	5 00	405 92	.....	442 70	437 00
432 30	1504 22	432 30	.....	432 30	1504 22	55 91	376 39	1438 31	298 57	281 15
.....	4514 20	4388 21	528 77	4916 98	4916 98	3347 65	15 9 33	1166 55	*	.....
.....	585 00	....	..... .	.....	585 00	.....	.....	585 00	*	.....
581 80	.....	581 80	.....	581 80	.....	18 00	563 80	.....	828 92	801 52
428 10	.....	428 10	.....	428 10	.....	25 00	403 10	.....	655 26	615 06
896 18	.....	896 18	.....	896 18	.....	14 00	882 18	.....	921 02	905 08
1149 08	3055 16	1149 08	.....	1149 08	3055 16	29 00	1120 08	2969 13	1541 11	1425 60
890 26	.....	.....	.....	890 26	.....	130 00	760 26	.....	1083 76	970 86
1274 02	.....	.....	.....	1274 02	.....	165 00	1109 02	.....	1357 67	1197 01
1271 28	3435 56	.....	....	1271 28	3435 56	196 00	1075 28	2944 56	1189 84	976 15
..... .	3293 97	2657 35	529 77	3187 12	3187 12	1191 83	1995 28	2102 14	3561 40	2519 25
462 50	....	.....	.. ..	462 50	.....	.....	.....	.....	348 50	348 50
860 00	1322 50	791 60	106 35	897 95	1360 45	67 95	830 00	1254 55	1089 20	1065 98
259 60	.....	203 60	191 18	394 78	.....	23 00	371 78	....	436 18	402 04
684 35	943 95	442 19	262 98	705 17	1099 95	23 88	681 29	897 07	750 32	711 89
929 30	.....	929 30	.....	929 30	1538 70	.....	929 30	.....	*	.....
755 88	1685 18	535 38	74 02	609 40	.....	23 25	586 15	1661 93	*	.. ..
. .....	782 69	.....	.....	.....	782 69	5 00	777 69	777 69	*	....
.....	2945 80	2744 88	135 34	2880 22	2880 22	622 07	2258 15	2324 73	*	.....
.....	.....	8 50	.....	.....	8 50	.....	.....	8 50	20 10	20 10
.....	.....	.....	.....	.....	.....	.....	.....	.....	82 17	74 13
147 20	.....	143 40	32 00	175 40	....	39 00	136 40	.....	207 41	199 66
356 87	504 07	225 93	85 09	311 02	486 42	28 00	283 02	437 07	335 81	320 21

* Not five years in office. † Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

COUNTY OR DISTRICT.	COUNTY TOWN.	OFFICE.	OFFICER.	Amount Earned.	Salary paid by the Government.
				$ c.	$ c.
Thunder Bay--*Con*	Port Arthur...	Local Registrar.....	James Meek.....	430 10	600 00
		District Court Clerk.....	"	454 65	*.. ....
		Surrogate Registrar.....	"	28 51	.....
Victoria.....	Lindsay	Sheriff	John McLennan.....	2379 23	.....
		Surrogate Judge	Judge Dean	Commuted at	
		Local Master.....	"	Commuted at	
		County Attorney.....	A. P. Devlin	339 05	.....
		Clerk of the Peace.....	"	913 09	.....
		Local Registrar.....	William Grace.....	129 05	675 00
		County Court Clerk.....	"	566 05	.....
		Surrogate Registrar.....	"	406 50	.....
Waterloo.....	Berlin.....	Sheriff	Moses Springer.... .	2915 82	100 00
		Surrogate Judge	Judge Lacourse	Commuted at	
		Local Master.....	"	Commuted at	
		County Attorney.....	W. H. Bowlby	484 90	....
		Clerk of the Peace.....	"	1273 09	.....
		Local Registrar.....	John McDougall.....	385 00	1075 00
		County Court Clerk.....	"	369 00	.....
		Surrogate Registrar.....	A. J. Peterson.....	1082 95	.....
Welland	Welland	Sheriff	James Smith	2112 81	....
		Surrogate Judge	Judge Baxter.	600 90	.. . . .
		Local Master.....	"	207 00	.....
		County Attorney.....	L. D. Raymond	194 50	.....
		Clerk of the Peace.....	"	630 77	.....
		Local Registrar.....	I. P. Wilson	311 50	833 00
		County Court Clerk.... .	"	444 05	.....
		Surrogate Registrar.....	.....	809 75	.....
Wellington	Guelph.....	Sheriff	R. McKim	2413 30	....
		Surrogate Judge	Judge Drew.....	Commuted at	

different County Judicial Officers in the Province of Ontario, etc.—*Continued.*

Total Salary and Earnings.	Total Earnings and Salaries in all his offices.	Amount received for present year	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officers during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1030 10	.....	1000 80	11 30	1012 10	.....	00	962 00	.....	*.....	.. ..
454 65	.... ..	352 59	88 66	441 25	.....	00	396 25	.....	*.....	.....
10028 51	1513 26	28 31	.....	28 31	1481 66	2 50	25 81	1414 76	*.....	....
.....	2379 23	1862 47	530 14	2392 61	2392 61	714 50	1678 11	1664 73	2804 47	2150 31
.....	500 00	.....	.... ..	500 00	... .	.....	500 00	....	†.....	.....
.....	900 00	.....	.....	900 00	1400 00	.....	900 00	1400 00	†.....	.....
339 05	.....	221 01	88 80	309 81	.....	.....	309 81	.....	310 16	308 48
913 09	1252 14	559 39	360 56	919 95	1229 76	.....	919 95	1252 14	975 01	957 21
804 05	.....	759 50	97 50	857 00	.....	5 00	852 00	....	879 19	853 19
566 05	.....	465 95	157 50	623 45	.....	5 00	618 45	.....	515 61	504 61
406 50	1776 60	365 50	89 99	455 49	1935 94	15 00	1920 49	1757 60	360 74	347 34
.....	3015 82	2692 28	428 54	.....	3120 82	1498 28	1622 54	1517 54	3122 58	1757 59
704 00	.....	.....	.....	704 00	.....	.....	.....	.....	†.	.....
591 00	1295 00	.....	.....	591 00	1295 00	.....	..... .	1295 00	†..... ..	.....
484 90	.....	484 90	155 80	640 70	.....	100 00	540 70	.....	648 25	544 85
1273 09	1757 99	1273 09	71 00	1344 09	1984 79	300 00	1044 09	1357 99	1257 69	937 69
1460 00	.....	.....	.....	1460 00	.....	50 00	1410 00	.....	1367 00	1309 00
369 00	1829 00	....	.....	369 00	1829 00	50 00	319 00	1729 00	384 49	324 49
.....	1082 95	.....	.....	.....	1082 95	141 00	941 95	941 95	991 88	856 54
.....	2112 81	2090 65	507 79	2598 44	2598 44	677 15	1921 29	1435 66	*.	....
600 90	.....	.....	.....	600 90	.....	.....	600 90	.....	484 78	484 78
207 00	807 90	53 09	27 10	180 19	681 09	3 00	77 09	804 90	194 38	188 08
194 50	.....	.....	.....	194 50	.....	15 00	179 50	.....	286 96	271 36
630 77	825 27	.....	.....	630 77	825 27	16 59	614 18	793 68	738 62	714 65
1144 50	.....	1102 20	46 80	1149 00	.....	45 10	1103 90	.....	1201 02	1167 06
444 05	.....	422 95	32 05	455 00	.....	21 75	433 25	.....	401 58	382 55
809 75	2398 30	801 80	49 80	851 60	2455 60	100 00	631 60	2232 45	*.....	.....
....	2413 30	1719 62	736 74	2456 36	2456 36	1761 77	694 59	651 63	2611 60	1110 97
... .	505 00	.....	.....	.....	505 00	.....	.....	505 00	†.....	....

*Not five years in office. †Commuted on average of previous five years.

APPENDIX F.—Schedule shewing Return of Fees and Emoluments of the

County or District.	County Town.	Office.	Officer.	Amount Earned.	Salary paid by the Government.
				$ c.	$ c.
Wellington—*Con.*	Guelph	Local Master	A. M. McKinnon	1210 70	
		Deputy Registrar	"	254 04	
		County Attorney	H. W. Peterson	757 55	
		Clerk of the Peace	"	2140 89	
		Deputy Clerk of the Crown	James Hough	96 75	500 00
		County Court Clerk	"	860 35	
		Surrogate Registrar	Alex. Mackenzie	1240 68	
Wentworth	Hamilton	Sheriff	Hon. A. McKellar	5263 03	
		Surrogate Judge	Judge Sinclair	Commuted at	
		Local Master and Deputy Registrar	J. E. O'Reilly	Commuted at	
		County Attorney	John Crerar	1834 80	
		Clerk of the Peace	"	1275 84	
		Deputy Clerk of the Crown	S. H. Ghent	457 45	500 00
		County Court Clerk	"	1388 41	
		Surrogate Registrar	"	1832 10	
York	Toronto	Sheriff	J. H. Widdifield	7352 27	
		Surrogate Judge	Judge McDougall	2881 50	
		"	Judge Morgan		666 00
		County Attorney	G. W. Badgerow	4779 09	
		Clerk of the Peace	T. H. Bull	2925 46	
		Surrogate Registrar	J. G. Brown	4822 10	
		County Court Clerk	Hon. A. M. Ross	5799 65	
Toronto	Toronto	Sheriff	Fred Mowat	17662 83	

different County Judicial Officers in the Province of Ontario, etc —*Continued.*

Total Salary and Earnings.	Total Earnings and Salaries in all his offices.	Amount received for present year.	Amount received for previous year.	Total receipts.	Total receipts by officer in all his offices.	Amount disbursed.	Net amount received.	Net amount due to or received by virtue of all his offices.	Average Gross Earnings for years 1887 to 1891, both inclusive.	Average of net amount due to or received by officers during these years.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1210 70	.....	816 29	305 25	1121 54	.....	65 00	1046 54	.....	1320 26	1313 26
254 04	1464 74	172 84	86 17	258 91	1380 45	5 50	253 41	1394 24	293 61	285 01
757 55	.....	523 60	157 55	681 15	.....	50 00	631 15	.....	687 50	548 60
2140 89	2898 44	1415 84	725 30	2141 14	2822 29	255 00	1886 14	2593 44	2313 86	1811 54
596 75	.....	596 75	.....	596 75	.....	0 50	596 25	.....	595 00	594 72
860 35	1457 10	848 75	8 95	857 70	1454 45	521 00	336 70	935 60	883 29	464 18
1240 68	1240 68	1240 68	26 72	1267 40	1267 40	60 00	1207 40	1180 68	1221 87	1181 67
.....	5263 03	4254 69	669 08	4923 77	4923 77	2850 36	2073 41	2412 67	5755 96	2723 14
.....	1000 00	.....	.....	.....	.....	.....	.....	1000 00	†.....	.....
.....	3500 00	.....	.....	.....	.....	400 00	.....	3100 00	†.....	.....
1834 80	.....	1834 80	200 00	2034 80	.....	20 00	2014 80	.....	1445 36	1428 82
1275 84	3110 64	1275 84	.....	1275 84	3310 64	300 00	975 84	2790 64	1303 93	1138 09
957 45	.....	931 65	41 15	972 80	.....	55 35	917 45	.....	964 89	940 71
1388 41	.....	1163 72	131 80	1295 52	.....	381 71	913 81	.....	1546 69	1313 73
1832 10	4177 96	1721 35	15 00	1736 35	4004 67	268 78	1467 57	3472 12	1566 73	1359 55
.....	7352 27	5743 36	1594 42	7337 78	7337 78	4139 19	3198 59	3213 08	*...	.....
.....	2881 50	.... ..	.....	.....	2881 50	.....	.....	2881 50	2544 72	2544 72
.....	666 00	.....	.....	.....	666 00	.....	.....	666 00	666 00	666 00
.....	4779 00	3425 80	1351 20	4777 00	4777 00	921 00	3856 00	3858 00	5227 39	4187 72
.....	2925 46	1935 11	240 35	2175 46	2175 46	556 00	1619 46	2369 46	3397 62	2786 67
.....	4822 10	... .	129 55	4951 65	4951 65	780 91	4170 74	4041 19	4315 01	3812 85
.....	5799 65	5759 45	22 60	5782 05	5782 05	1675 10	4106 95	4124 55	*... ...	.....
.....	17662 83	14251 00	2825 50	17076 50	17076 50	10081 47	6995 03	7581 36	16170 52	7629 31

*Not five years in office. †Commuted on average of previous five years.

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